TABLE OF CONTENTS

TABLE OF CONTENTS

UNL/USDA PROPOSALS FILE.....FILE PAGE

PROPOSAL FOR FUNDING

Calendar Year 2018

ORGANIZATION: Wheat Quality Council

TITLE OF PROJECT: Wheat Quality Enhancement and Comparison

AMOUNT REQUESTED: $3,000

PRINICPAL INVESTIGATOR: Wheat Quality Council

MISSION:

To analyze advanced experimental wheat lines for milling and baking/processing quality.

GOALS AND OBJECTIVES:

Provide Nebraska wheat breeders the opportunity to have their potential varieties evaluated by industry cooperators against wheat lines from other states.

An industry-wide review will take place in February 2019, where printed results of milling and baking quality tests will be analyzed and feedback provided to breeders.

PROJECT NARRATIVE:

Hard Winter wheat breeders from the University of Nebraska would be allowed to submit one or two lines for an industry wide milling and baking analysis. They would be allowed to pick sites to grow their lines side by side with a good quality check variety. The harvested lines would be sent to the Hard Winter Wheat Quality Lab at Manhattan KS. The wheat would be milled and the resulting flour sent to ten to fifteen cooperators who would test bake them. The Nebraska lines would be compared with lines from SDSU, MT State University, Colorado State, OK State, KSU, TX A&M, AgriPro, Westbred/Monsanto, Limagrain and other private breeders.

All information garnered from the milling and baking tests will be compiled in an annual report that is available electronically to members of the WQC.

An annual meeting is held each February to discuss the results of this work. This allows the wheat breeders to receive feedback on the qualities the milling and baking industries desire. It also provides a snapshot of what will be grown and processed by the industry in the next few years.

BUDGET:

The Nebraska Wheat Board will provide $3,000 in Calendar Year 2018 to help pay for this quality analysis effort. Wheat organization funding is based on state production much like US Wheat Associates. Kansas and North Dakota pay $8,000; Oklahoma, South Dakota and Montana pay $4,000; Minnesota, Colorado, and Texas pay $3,000 each year. The payment for membership dues will go to the Wheat Quality Council.

PROJECT TIMEFRAME:

Hard winter wheats that may already be planted will be harvested in the summer of 2018 and entered in the milling and baking analysis. All information will be available for the public meeting in February, 2019 at Kansas City.

U.S. WHEAT ASSOCIATES
2018 Activities Proposed for State Funding
January 2018

Region	Activity	Request	Activity Description	Expected Timing	Wheat class
Mexico, Central America, Caribbean Region	**2018 Costa Rica Trade Team to the US**	**$13,500** MAP Funded	A trade delegation from Costa Rica will travel to the US for one week including visits to HRS, SW and HRW states (ND, MT, OR). Participants will meet with various state wheat commissions, producers, the grain trade, and visit a country elevator, focusing on US grain grading and inspection procedures, wheat buying specifications and grain handling operations both at interior elevators as well as at the PNW. This activity will put representatives from the Costa Rican milling industry in contact with traders and renew their familiarity with the advantages of the US wheat marketing system. Funds will cover airfare, lodging, and per diem while in the US for the team members and the USW/Mexico staff.	June-August 2018	HRS, HRW, SW
South America	**2018 Latin America Buyers Conference**	**$25,000** MAP Funded WGC has contributed $7,500	Over sixty of the most influential wheat purchasing decision makers from the Mexico, Central America, Caribbean, and South America regions will be invited to attend a two day wheat buys conference, tentatively planned for Rio de Janeiro, Brazil. This conference will provide a forum where these buyers can interact directly with the grain trade and discuss issues of common interest. Conference participants will be chosen by USW based on import volumes, influence in the industry and other related factors. The full cost of this conference is expected to be approximately $125,000, most of which will be covered by MAP. Requested state funds would help sponsor the welcome reception and a farewell event, if held. These events cannot be fully billed to FAS, and yet very popular aspects of the conference. Funds may also help cover consulting fees and travel costs for speakers/consultants and group meals.	July 18-20, 2018	SW, SRW, HRW, HRS, Durum
	2018 ALIM Conference	**$10,000** Mostly funded through MAP.	The XXXVII annual conference of the Association of Latin American Industrial Millers (ALIM) is scheduled to take place in November 2018 in Chile. One USW Arlington staff member is expected to make a presentation on the supply and demand situation of various US wheat classes, highlighting the quality and economic advantages of the recent US wheat harvest compared to other wheats available. As is customary, representatives from Canadian exporters, the Canadian Grain Institute and Argentine Ministry of Agriculture are expected to be present and speak about their own wheat crops. The attendees will mostly be mill owners and managers from throughout Latin America. USW travel to and attendance at the ALIM conference is funded through MAP. State funds are requested to help cover a USW sponsored reception event. This reception will be high-profile and will draw attention to USW and stakeholder sponsorship, but for which FAS funds can only cover a limited portion.	November 2018	SRW, Durum, HRW, HRS, SW

Region	Activity	Request	Activity Description	Expected Timing	Wheat class
	2018 Ecuador/Chile Trade Mission	**$10,000** MAP Funded; WGC has contributed $15,000	USW will host a team of Ecuadorean and Chilean wheat purchasing mill officials to the US, tentatively ND, NE and OR. From Ecuador, participants will be selected from ASEMOL including Moderna Alimentos and Sumesa, a major pasta plant in Guayaquil. The trade mission will likely include visits to the PNW, ND and NE. The team will feature a stop at an FGIS laboratory, meetings with wheat producers and grain exporters, putting Ecuadorean and Chilean wheat buyers in contact with traders and renewing their familiarity with the advantages of the US wheat marketing system over other origins. The total cost of this activity is $25,000. Funds will cover airfare and per diem for five team members and one USW staff.	June 24-30, 2018	HRS, HRW, SW
South Asia	**2018 Philippine Trade Team**	**$49,000** FMD Funded	A six-person team from the Philippines flour milling industry will travel to the US (DC, OR, WA) for up to ten days. The participants will meet state wheat commissions, producers, FGIS and grain traders, and visit a port loading facility and an FGIS dockside laboratory. The flour millers will better understand the US wheat marketing system operations and will learn about various purchasing options available from the US marketing system to reduce price while maintaining product quality. USW will cover airfare, hotel accommodations and per diem during the travel period for the team members and one USW Manila staff.	June 14-24, 2018	HRW, SW, HRS
	2018 South Asia Regional Trade Team	**$22,000** FMD Funded WGC has contributed $10,000	A five-person team from the management, procurement and operations of a regional flour milling industry company will travel to the US (PNW) for up to ten working days. The participants will meet state wheat commissions, producers, FGIS and grain traders, and visit a port loading facility and an FGIS dockside laboratory. The flour millers will better understand the US wheat marketing system and will learn about various purchasing options available from the US to reduce price while maintaining product quality. The total cost of this activity is $32,000. Funds will help cover airfare, hotel accommodations and per diem during the travel period for the team members and one USW South Asia staff.	July 15-25, 2018	SW, HRS, HRW
North Asia	**2018 KOFMIA/USW Baking Seminars featuring SW/HRW Blend for Baguettes**	**$5,000** Not funded	In recent years, there has been an increase in the consumption of baguettes, as they are perceived to be a 'health bread' in Korea. Unfortunately, many Korean bakers still believe that baguettes must be made with French wheat. In order to combat this perception, USW will partner with KOFMIA to implement a series of baking seminars in Seoul, Daegu, Kwang Joo, and Pusan. Attendees will be bakers and bakery owners. The seminars will highlight the results of three years' worth of research and analysis done at the Wheat Marketing Center and Korea Baking School which will feature the use of SW and HRW (ratio 20 SW:80 HRW) as the ideal blend to produce baguettes. KOFMIA will cover most of the costs, but USW will help cover facility and equipment costs needed to host the seminars.	July – October, 2018	HRW, SW

Region	Activity	Request	Activity Description	Expected Timing	Wheat class
	2018 Korea Wheat Crop Survey Team	**$18,400** FMD Funded	The US Wheat Crop Survey Team, consisting of four import managers from four milling companies will travel to the US for one week to survey the latest US wheat crop situation so that they can establish an annual US wheat import plan for 2018. The itinerary for the team will tentatively include visits to MT, ID and OR so that the team can learn about the US wheat current supply and demand situation, production and exportable quantity, and current and future price trends. The team will be accompanied by USW Seoul staff. USW will cover the costs of airfare for USW Seoul staff and per diem for all the travelers. The participating companies will pay airfare of the participants.	July 21-29, 2018	HRS, HRW, SW
	2018 Taiwan WMC Flour Quality Study	**$23,000** MAP Funded	USW will sponsor three millers and one baker selected for their size and influence to attend a custom one-week short course at the Wheat Marketing Center (WMC). The course content will include product test baking to evaluate final products made from different flours, supplemented with lectures on US wheat flour quality for making frozen dough, tortilla, whole wheat and other products. USW Portland office will present a briefing on US wheat production and quality. USW Taiwan technical staff will assist the participants to complete the product testing and thereby evaluate the US wheat performance in various product mixes. Funds will cover the tuition fees and per diem for the participants, while the participants will pay the required airfare.	June 4-9, 2018	HRS, HRW, SW
	2018 North Asia Marketing Conference (NAMC)	**$40,000**	A buyers conference will be held in Kota Kinabalu, Malaysia for both private and public organizations that procure wheat from the international market. Approximately 60 customers from Korea, Taiwan and Japan will attend, along with USW regional staff. The agenda will include speakers from USDA, USW staff, wheat class representatives, traders and banking representatives. The total cost of this conference is expected to be approximately $200,000, most of which will be funded from MAP. Requested state funds would help sponsor the welcome reception, the farewell event, and a golf competition (if held). These events cannot be fully billed to FAS, and yet are among the most popular aspects of this conference.	August 26-29, 2018	SRW, Durum, HRW, HRS, SW
Middle East, East and North Africa Region	**SRC/SDS Testing**	**$8,700** MAP Funded	USW will invite SRC/SDS expert Dr. Art Bettge to conduct a 14 day visit to end-product manufacturers, flour millers and traders in Morocco, Dubai, Sharjah, Kuwait and Bahrain to follow up on work done by USW in the promotion of SRC and SDS testing on wheat and flour for soft wheat flour functionality analysis. USW expects to visit up to 7 operations in Morocco, 4 operations in Dubai, one each in Bahrain and Kuwait for one-on-one consultations with these groups. Seminars will also be held at the IFIM facility in Morocco for 25 importers, QC staff and operations managers, and in Dubai for 15 key importer representatives from Oman, Yemen and Iraq. Funds will go toward seminar auditorium rent, facility costs, ground transportation, STRE events, and for consulting fees and travel expenses.	April 16-30, 2018	SW, SRW

Region	Activity	Request	Activity Description	Expected Timing	Wheat class
China	**2018 China End Products Collaborative and Contracting for Wheat Value Course**	**$40,000** FMD Funded	A team of up to twelve participants, including wheat quality specialists, production managers, millers and buyers, will develop protocols for specific end-products, identify flour quality specifications, and learn about US wheat classes or blends of classes that will meet their quality requirements. Effective blends of US wheat classes will be identified that participants will find to be competitive with Australian wheats (ASW, APH, and AH) or Canadian CWRS for Western- and Asian-style products. The purpose of this effort is to address end-product issues where US wheat is being challenged or displaced by competitor wheat due to real or perceived functional quality differences. This course will be held at the WMC, with a few days to be spent in MT. Funding will go toward food, lodging, international and domestic transportation, course fees, flour samples' freight and evaluation costs.	May 6-19, 2018	HRS, HRW, SW
Worldwide	**2018 Wheat Quality Improvement Team (WQIT)**	**$8,000 per person** WGC and Oklahoma will sponsor breeders.	USW will organize a team of up to six wheat breeders, supporting wheat quality laboratory personnel, or extension small grains specialists, and one USW staff person to meet with key overseas buyers, millers and end-product manufacturers to México, Guatemala, Costa Rica, Peru and Colombia. The primary goals of the team are to gather input on wheat quality from key customers and return that information to US wheat breeding programs, demonstrating the US industry's willingness to listen and exchange ideas with customers, to share quality improvements of newly released US wheat varieties, and to agree on key messages to bring back to the US industry and incorporate into their respective breeding programs. Past teams to Asia, Europe and Latin America have helped US wheat breeders and others understand key customer likes and dislikes about US wheat and how US wheat compares with competitors. Each team member is asked to provide a presentation showing quality improvements in the wheat varieties released over time. Funds will pay for airfare, per diem and related travel expenses for the wheat breeders.	March 11-22, 2018	SRW, HRS, HRW, SW, Durum

Region	Activity	Request	Activity Description	Expected Timing	Wheat class
	2018/19 Food Aid Learning Journey	**$8,000 per person estimate** Minimum of five state participants needed. Not funded with MAP/FMD funds. Firm intention to participate needed by September 30, 2018.	To encourage deeper involvement of states and board members in food aid policy, USW proposes a second trip to a food aid recipient country in 2018 or 2019. The destination country will be determined based on feedback and consultations with OCBD, and will prioritize a country that has both Food for Progress and Food for Peace programs (examples of possible countries include Tanzania, Ethiopia, Jordan, or Haiti). Participants will include one USW staff member from Arlington and five USW participants (including both board members and state wheat commission staff). The trip needs at least five participants to be viable at the proposed price point. The trip will include one day of briefings in DC before departure, to include meetings with USDA OCBD, USAID Office of Food for Peace, and the headquarters offices of NGOs working in the destination country. During the trip, the group will meet with the flour mill that purchased monetized wheat for Food for Progress, a bakery receiving the flour, a Food for Progress project, a McGovern-Dole project if available in country, and a Food for Peace project. Funds will cover: - Round-trip airfare for all team participants to DC, onward to the destination country, and then returning home. - Lodging and M&IE for US participants for the DC portion of the trip - Lodging and M&IE for all participants in the destination country - Transportation in the destination country - Visas and other miscellaneous travel expenses for all team participants For all questions and expression of interest, please contact Elizabeth Westendorf at Ewestendorf@uswheat.org.	July 1, 2018 – June 30, 2019	

- **Title of Project:** Nebraska Agricultural Youth Institute (NAYI)
- **Type of Project:** Publicity and Education
- **New or Renewal:** Renewal
- **Total Amount Requested:** $2,000.00
- **Project Duration:** July 9- 16, 2018
- **Project Coordinator**
  - **Name:** Christin Kamm
  - **Address:** 301 Centennial Mall South
    PO Box 94947
    Lincoln, NE 68509
  - **Phone:** (402) 471-6856
  - **Fax :** (402) 471-6876
  - **Email:** christin.kamm@nebraska.gov
- **Organization**
  - **Name:** Nebraska Department of Agriculture
  - **Address:** 301 Centennial Mall South
    PO Box 94947
    Lincoln, NE 68509
  - **Phone:** (402) 471-6856
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  - **Email:** christin.kamm@nebraska.gov

Project Abstract

The goal of the 2018 Nebraska Agricultural Youth Institute (NAYI) is to help educate students about and advocate for the agricultural industry. Around 200 high school delegates from across Nebraska attend the Institute to learn about the careers and opportunities available to them within the agricultural industry. The delegates have a chance to network with each other as well as with industry professionals representing different agricultural commodity boards and companies. Many of these organizations will discuss current issues in agriculture and will educate delegates about their respective organizations.

Project Outcomes

The delegates attending NAYI 2018 will leave the conference with a better understanding of the different sectors of the agricultural industry, the many job opportunities within each sector, and confidence in the future of the industry. In addition, delegates will develop leadership skills and create lifelong connections with speakers, industry professionals, and other delegates.

Method or Approach

To educate Nebraska youth about agriculture and the wheat industry, the Nebraska Agricultural Youth Council (NAYC) will host a five-day summer conference. NAYI is located on UNL's East campus and is organized by the Nebraska Department of Agriculture and the NAYC. Throughout the week, delegates will hear from industry leaders and motivational speakers, participate in an interactive farm management game, tour different agricultural departments on UNL's campus, explore careers available within the industry, develop leadership skills, and network with other delegates and speakers. Students have the opportunity to discuss current issues in agriculture and to share their ideas with professionals in the agricultural industry.

Relevance

There is a growing disconnect between agricultural producers and end-users. The students attending NAYI 2018 will hear directly from the Nebraska Wheat Board about how to exceed the expectations from consumers. In addition, the delegates will learn more about wheat production. These delegates will then be able to continue to educate consumers about the wheat industry and promote Nebraska wheat. This promotion will aid wheat producers in expanding the industry, and will allow future consumers and producers to gain the education needed for success in the industry.

Impact

NAYI 2018 will impact both delegates and speakers directly, and consumers across the state indirectly. The delegates will gain a better understanding of the wheat industry in Nebraska. By networking with speakers and other delegates, these students will continue to expand their knowledge of agriculture. These same students will be interacting with consumers all across the state and sharing their experiences. Having the background knowledge of the wheat industry will allow NAYI delegates to educate their fellow consumers. Speakers will benefit from the conference as they are investing in the success of the agriculture industry by educating youth about agriculture. These delegates will be future consumers and producers of wheat, and will likely work with the Nebraska Wheat Board in the future.

Method Suitability

As the longest running program of its kind in the nation, NAYI 2018 allows delegates to gain a thorough understanding of the agricultural industry by networking with industry professionals. This Institute is geared toward high school students and the topics discussed are relevant to their age and interest levels. Rather than learning from the internet or other areas, students are learning from the individuals with expertise in the industry.

Budget

Personnel Salaries: $0

Equipment: $0

Supplies and Materials: $8,359

- Awards for State Dinner: $1,730
- Dance: $550
- Application Expenses and Promotional Materials: $1,245
- Padfolios, Yearbooks, Water bottles: $4,514
- Miscellaneous: $320

Travel: $6,710

- Parking Fees: $1,000
- Van Rental: $2,130
- State Dinner Shuttle Service: $1,090
- Airfare for Taiwan Guests: $4,220

Honorarium: $3,800

- 19 NAYC Members at $200 each

Food: $55,954

- Meals: $37,360
- State Dinner: $16,335
- Valentino's Pizza: $2,259

Housing: $18,000

- Delegate Rooms: $17,000
- Conference Spaces: $1,000

Speaking Fees: $11,000

- Opening Speaker: $5,000
- Closing Speaker: $5,000
- Technical Speakers: $1,000

Total: *$103,823*

Other Funding Sources

To Date:

- Nebraska Investment Finance Authority: $5,000
- Nebraska's Natural Resource Districts: $3,000
- Ward Laboratories: $1,000
- Aurora COOP: $3,000
- Nebraska Corn Growers Association: $250
- Behlen Manufacturing: $100
- Hoegemeyer Hybrids: $100
- Settje Agri-Services & Engineering, Inc.: $500
- United Seeds, Inc.: $250
- Green Plains Inc.: $1,000
- Pillen Family Farms: $500
- Tyson: $100
- Nebraska Corn Board: $5,000
- Midwest Laboratories, Inc.: $250
- USDA Farm Service Agency: $500
- Gavilon, LLC: $500
- ADM: $2,500
- Country Partners COOP: $500
- Nebraska Agri-Business Association, Inc.: $250
- Leisy & Leisy, Inc.: $750

Pending:

- Farm Credit Services of America: $3,000
- Nebraska Pork Producers: $1,000
- Nebraska Grain Sorghum Board: $125
- Nebraska Soybean Board: $5,000
- Nebraska Dry Bean Commission: $1,000
- USDA Natural Resources Conservation Service: $500

Consumer Education: Wheat and Gluten in Nebraska

Type: Publicity and Education, NEW project

Total Amount Requested:

$34,800.00 for a six-month campaign (which could be aired as two, three-month campaigns within a 12-month window)

Or,

$19,500 for one, three-month campaign

Project Duration: Subject to your needs based on the options above

Coordinator & Organization:

Jim Timm, President/Executive Director
Nebraska Broadcasters Association
11414 West Center Road, Suite 342
Omaha, NE 68144
402-933-5995 (phone)
402-933-0059 (fax)
jim@ne-ba.org (email)
www.ne-ba.org

Abstract: Nebraska Wheat Board will air a series of recorded messages on statewide radio stations through the NBA's Public Education Program (PEP). Messages will be written and produced for consumer education; to help Nebraskans better understand the importance of wheat in nutrition, gluten acceptance, and agricultural education in general as desired by Nebraska Wheat Board.

Outcomes: Depending on the contents of your messages, outcomes may include increased awareness and understanding of wheat in nutrition and clarity of facts versus myths on the effects of gluten consumption. Increased web traffic may result by directing listeners to "learn more about the healthy benefits of Nebraska wheat at www.nebraskawheat.com" in every message, regardless of its theme. Anecdotal feedback from consumers and wheat producers may also be received.

Method: Participating NBA member radio stations reserve part of their unsold commercial inventory for PEP messages contracted through the NBA. The PEP is available only to government agencies and qualifying nonprofit organizations, which usually lack the funding to place traditional media buys. The PEP allows these organizations to air noncommercial messages to educate Nebraskans on their initiatives. NBA can assist with typical writing and production of messages at no additional charge and is responsible for distributing approved messages to member stations.

PEP airtime is provided on a "multiplier" basis upon completion of the campaign, at a minimum of $1.00 returned for each $1.00 invested. NBA limits the number of PEP campaigns airing to assure the promised return for all partners. A summary of total messages aired by each participating station is provided at the end of each calendar month during which your PEP campaign is active.

Relevance: In a time where consumers are increasingly concerned about how their diet affects their health, multiple and often mixed messages on the benefits and detriments of certain food ingredients leave most people confused. Through a carefully worded, sustained radio campaign, Nebraska Wheat Board can broadcast factual consumer information that will rise above the comings and goings of related messages that compete for the consumer's trust and Nebraska values.

Impact: *Nebraska consumers* will benefit from this project, by achieving a better understanding of the benefits of wheat consumption, along with the erosion of certain myths about gluten and wheat consumption.

Nebraska wheat producers will benefit from this project, through greater acceptance of wheat as an ingredient in the meals Nebraskans consume, as well as the psychological lift of hearing a campaign that supports the hard work they engage in as producers.

Nebraska Wheat Board will benefit from this project, by helping to fulfill one of its priorities of gluten acceptance and nutrition education.

Method Suitability: Radio gets results. Radio's national audience is at an all-time high; some 244 million Americans age 12 and older use radio in a given week.

PEP messages are heard by Nebraskans. *"We've received so many comments from all across the state about the quality of our messages and the times during the day that they've been heard – a clear indication that working with the Nebraska Broadcasters Association and the Public Education Program was a wise decision for our organization's efforts." -- Nicole Carritt, Executive Director, Project Extra Mile, Omaha*

Budget:

$34,800.00 for a six-month campaign with a 2:1 guaranteed ratio (could be aired as two, three-month campaigns within a consecutive 12-month window).

Or, $19,500 for one, three-month campaign with a 1:1 guaranteed ratio.

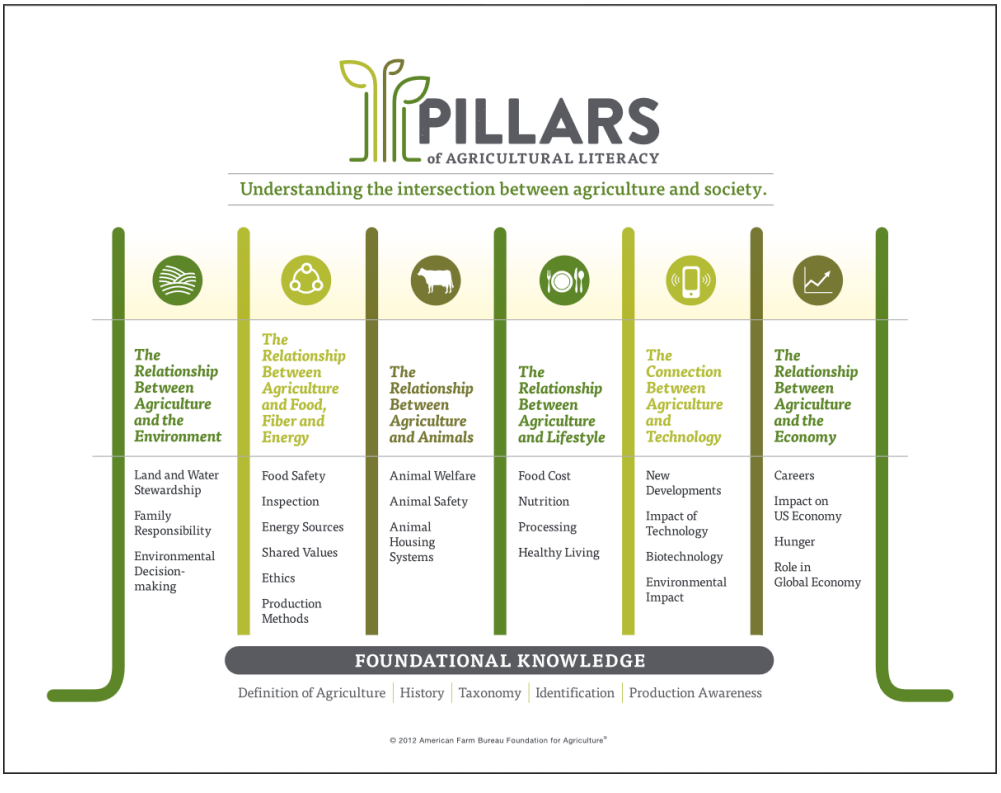
An invoice with a monthly report of total messages aired by station is mailed within about three weeks of the end of each calendar month. Payment is expected within 45 days of receipt of invoice; credit cards are not accepted.

Proposal to the Nebraska Wheat Board
February 2, 2018

Title of Project	Nebraska Agriculture in the Classroom – Ag Mag
Type of Project	Publicity and Education
New or Renewal	New
Total Amount Requested	$2,500
Project Duration	12 Months (July 1, 2018 – June 30, 2019)
Project Coordinator	Megahn Schafer, Executive Director Nebraska Farm Bureau Foundation 5225 S 16th St Lincoln, NE 68512 Phone: 402-421-4742 Fax: 402-421-4439 megahns@nefb.org
Organization	Nebraska Farm Bureau Foundation 5225 S 16th St Lincoln, NE 68512 Phone: 402-421-4747 Fax: 402-421-4439 foundationforag@nefb.org
Additional Participating Institutions	None

Project Abstract: Nebraska Agriculture in the Classroom is proud to introduce its newest resource, *Ag Mag*, a weekly-reader style Ag Mag and Teacher's Guide to be mailed to all fourth-grade classrooms in Nebraska. The primary objective of this project is to consistently reach a high number of Nebraska students with a resource that is useful in the classroom, engaging for students and their families, and filled with timely facts about Nebraska agriculture and its impact on daily living, jobs, and economics in our great state.

Project Outcomes: *Ag Mag* will promote agricultural literacy among students and families. Each issue will explore concepts included in the Pillars of Agricultural Literacy.



Ultimately, *Ag Mag,* and all Nebraska Agriculture in the Classroom programming, aims for progress toward the following outcomes:

- Agricultural policies positively impact global health, food, technology, the environment, and the economy
- The needs of agricultural employers are met with a well-prepared, skilled, and flexible workforce
- A diverse U.S. agricultural industry is an economic engine that is valued by all
- Farmers provide—and consumers have access to—healthy and nutritious food choices
- Youth and adult consumers are agriculturally literate, make informed decisions, and advocate for agriculture

- The world has a secure, safe, and adequate food supply
- The U.S. remains a sovereign nation

Source: https://www.agclassroom.org/affiliates/doc/logic_model.pdf.

Method or Approach: The method of Ag Mag is to provide a print copy to every fourth-grade student in Nebraska. In addition, any student or consumer can view an online version on the Nebraska Farm Bureau Foundation website. Teacher guides, corresponding activities, and opportunities for further learning are also available online.

There are currently 905 public and private elementary schools in Nebraska. Each school will receive a package of 30 Ag Mags along with a form to request additional copies. Larger schools can have three to seven sections of fourth grade classrooms. Because of this, enough Ag Mags will be printed for 1,000 classrooms. The cover letter will include the website address where teachers can view a corresponding Teacher Guide that contains classroom integration ideas, Nebraska content area standards connections, and a glossary.

The Ag Mag series will be written to support Nebraska fourth grade content area standards for language arts, social studies, and science. It can serve as a large class discussion piece, an activity for small groups or individuals, or an at-home enrichment resource.

Relevance: The Ag Mag project will increase the number of Nebraskans that understand the basics of agriculture and appreciate the positive impact agriculture makes in the lives of all Nebraskans, rural and urban. Providing this resource to fourth grade students during the year they focus on Nebraska studies will equip teachers to factually showcase the state's number one industry. In addition, career exploration begins in 4th-grade curriculum, so highlighting the wide variety of careers supported by Nebraska agriculture will expose students to exciting fields of study and job opportunities to explore.

Our students are our future consumers, leaders, and workforce, and this publication will prepare them to make informed choices regarding food, fiber, and fuel for their families and communities.

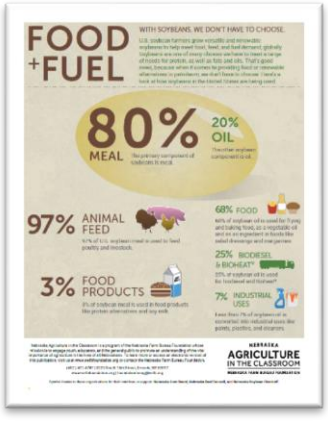
Impact: Wheat producers will benefit from a population base that values Nebraska agriculture. Students who are well-informed about the contributions of agriculture will become the consumers, employees, and community leaders needed to maintain a positive environment for success of agriculture in the future. Because *Ag Mag* is also a take-home piece, this project will accomplish outreach to families, as well.

Wheat producers can benefit more directly through wheat features in issues of *Ag Mag.* The first issue, At School With Agriculture, featured wheat bread and a wheat roll in a section about healthy eating. *Ag*

Mag has also featured spotlights on specific commodities including corn and soybeans, and a future issue could have a similar lesson about wheat (see "Let's Learn About Corn" and "Food + Fuel" for examples).

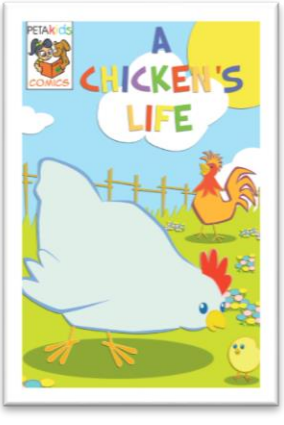
Method Suitability. Fourth grade students spend nearly three hours per day on reading and writing in their classrooms. *Ag Mag*'s focus on literacy will improve teachers' ability to use the resource, as these requirements dominate educational minutes in a fourth-grade classroom.

The Ag Mag will also feature phenomenon-based and cross-curricular learning, both of which are of interest to educators. Phenomenon-based learning suggests students learn best when viewing a topic in its real context and from several perspectives. Phenomenon Based Learning actively creates better opportunities for integrating different subjects and themes. Sample phenomenon to be featured through the context of agriculture include technology, the environment/natural resources, a healthy lifestyle, sustainability, energy, and careers.



The *Ag Mag* project purposefully combines a print resource with hands-on activities and online tools as a strategy to capture the interest of a wide variety of students, teachers, and families.

Finally, *Ag Mag* will provide an accurate, counter-balancing view of agriculture as compared to similar-style publications such as *Kind News* distributed by the Humane Society of the United States and the Kids Guide to Helping Animals distributed by the organization People for the Ethical Treatment of Animals.



Budget. The first-year budget for two issues for the current school year is $44,300 (details below). The Nebraska Farm Bureau Foundation has raised funding for the first two issues and is currently seeking funding for issues 3 and 4 for the 2018-2019 school year. The Nebraska Corn Board

($10,000), the Nebraska Soybean Checkoff ($5,000), The Nebraska Pork Producers ($6,000), and individual donors have supported the *Ag Mag* project.

Per Issue Budget Estimates to Serve 30,000 Students (1,000 classrooms)

Printing, $0.25 per copy	$7,500
Postage, $7.50 per packet of 30	$7,600
Content Development, 50 hours	$4,650
Graphic Design, 40 hours	$2,400
Total Per Issue	$22,150

X 2 Issues Per Year

Total Year One Cost Estimate **$44,300**

Thank you. Thank you for your consideration. Please do not hesitate to contact us for more information.

Rural Radio Network

KRVN AM/FM • Lexington KNEB AM/FM • Scottsbluff

Marketing Proposal for…..

The Nebraska Wheat Board

Funding Request for **"Growing Wheat Well"** radio series; July-August 2018

On behalf of the Nebraska Crop Improvement Association, we request funding for the 2018 "Growing Wheat Well" radio program to air on KRVN, Lexington and KNEB, Scottsbluff. If funded, this will be the 19th consecutive series of "Growing Wheat Well".

Objective: The Growing Wheat Well programs are designed to provide wheat producers with agronomic and marketing information just prior to the new wheat seeding season. The programs will air for 5 weeks – July 17, 2018 through August 16, 2018.

The requested funding from the Nebraska Wheat Board is **$2,678.00,** which partially funds 30 Growing Wheat Well programs on each station - KRVN and KNEB.

30 Growing Wheat Well programs on KRVN	
30 Growing Wheat Well programs on KNEB	
Funding Request-Nebraska Wheat Board	$2,678.00
Investment-Nebraska Crop Improvement	$4,972.00
Total Program Cost	$7,650.00

**As possible, additional Wheat Industry sponsors can be added to expand program frequency.

The Nebraska Wheat Board will be recognized as a major co-sponsor of this program, along with the Nebraska Crop Improvement Association.

Your funding is provided to the Nebraska Crop Improvement Association. All invoices from KRVN and KNEB will be directed to the Nebraska Crop Improvement Association.

PO BOX 880 - LEXINGTON NE 68850-0880 - 308-324-2371

January 19, 2018

Mr. Royce Schaneman, Executive Director
Nebraska Wheat Board
301 Centennial Mall South - 4th Floor
Post Office Box 94912
Lincoln, Nebraska 68509

Dear Mr. Schaneman,

On behalf of the Nebraska Crop Improvement Association, I'm submitting the attached funding proposal for the 2018 "Growing Wheat Well" radio programs that air on KRVN, Lexington and KNEB, Scottsbluff. Thank you and the Nebraska Wheat Board members for your support of this program for the past 19 years.

Please contact me at 308-340-0695 (cell), or email gstamm@krvn.com if there are any questions or there is need of additional information for the funding request.

Sincerely,

Gina Stamm, Sales Representative
KRVN - Nebraska Rural Radio Association
Post Office Box 880
Lexington, Nebraska 68850-0880

Enclosure

TO: Royce Schaneman, Executive Director
The Nebraska Wheat Board (NWB)

FROM: The Home Baking Association (HBA)
Charlene Patton, Executive Director-LL: 785.478.3283; E: hbapatton@aol.com
Sharon Davis, Program Development Director--LL: 785.539.7044; E: hbadavis@gmail.com

RE: FY 2018 Call for Proposals
DATE: January 30, 2018

Thank you for reviewing the following proposal to support the Nebraska Wheat Board and Nebraska wheat producers in *domestic marketing, education and wheat consumption*.

Proposal's Program focus: Home Baking Association resources are a perfect fit for Nebraskawheat.com/educators page invitation-- Looking to help your class gain an understanding of the role wheat plays in our everyday lives? You've come to the right place. This site is your access point to nutritional information, classroom tools, kid-friendly recipes, and more! (On-line, nebraskawheat.com, 1/30/18) HBA's non-profit coalition provides a one-stop shop for the latest baking resources for educators at home (parents), childcare, classrooms and out-of-school programs.

Title: *Bake to Build STEAM* Wheat Flour Promotions and Education Resources
Type: Domestic marketing, Publicity and Education
Renewal with New Programs annually
Amount requested: $2,000
Project duration: July 1, 2018 to June 30, 2019
Project Coordinator: Charlene Patton and Sharon Davis

Home Baking Association
Contact information 2931 Gainsboro Road, Topeka, KS 66614
T: 785.478.3283 Fax: 785.478.3024
E-Mail: hbapatton@aol.com and hbadavis@gmail.com

Project abstract: HBA with its 37 members and staff will research, develop and extend compelling wheat flour events and resources for Nebraska Wheat's access to Nebraska households and communities via 2 MM educators in Nebraska and nationwide.
Target audiences are those who conduct Pre-K to 12th grade home, school classroom and out-of-school baking or cooking skill-building programs with wheat flour.
HBA's non-profit status is highly valued by youth educators and provides a one-stop connection to primary providers of reliable wheat agricultural, home and classroom resources.
NWB gains all benefits from HBA's collaboration with member test kitchens, partners (including Wheat Foods Council, National Extension FCS, FCCLA and The Family Dinner Project) and HBA staff to link with and provide quality consumer food resources to provide Nebraska educators of young consumers.
HBA does not replicate the audiences of Wheat Foods Council, but builds a foundational consumer base using hands-on baking education to build knowledge and loyalty to wheat flour and foods it produces.

Project goal: *Grow the practice of year-round baking in homes, schools and out-of-school programs to improve foundational knowledge of wheat flour and gluten's essential role in baking success, healthfulness and wheat foods' consumer economic benefits to individuals, homes, schools and community services.*

Project outcomes: Reach 2 million youth educators in U.S. and Nebraska in 82 MM households

1. HBA delivers STEAM: wheat agricultural knowledge, flour baking science, ingredient literacy, culinary sciences, tech, engineering, art and math connections in career and family teaching resources via HBA e-news, blogs, social media and HomeBaking.org to Nebraska food educators and youth programs.

2. Multiple **HBA partnerships** further the advocacy for wheat foods and our reach. Face-to-face and online presence with National Extension & 4-H, FCCLA and FCS educators, and out-of school programs assists in delivering baking activities directly to classrooms, parents and out-of-school educators. Wheat-to-table baking ingredient knowledge and applied baking activities are delivered to educators via HomeBaking.org, face-to-face events, enews and social media for its members and partners.

3. NWB access has full access to HBA drop-in-ready resources to extend directly to your audiences.

Methods: HBA staff members, with the oversight of the HBA members and board

1. Research, compile, prepare, vet and delivers "**how and why bake**" for weekly social media posts; Wordpress blogs, (400,000 views), web-site resources for HomeBaking.org visitors and monthly educator e-news to 59,231 youth educators with wheat and baking resources
2. Provides to NWB links, web site, social media and face-to-face opportunities with HBA resources and events; all are available to NWB for re-posting and extending. HBA staff is at your service.
3. Research, propose, promote and provide baking workshops, media features, for HBA and member wheat flour resources at state, regional and national events (see 2017 Annual Report) 2018 Funds apply to: 4-H National Congress; FCCLA- Midwest and National Leadership Conferences; Career and Tech Educators (ACTE) Ag and foods teachers; Child and Adult Food Programs (CACFP); National Extension Association meeting.
4. Develop new HBA resources and extend to partner Wheat Foods Council dietitian and nutrition educators. Full list of partners is provided on the Annual Report.
   In 2018: NEW Digital Baking Lab manual; 10 Baking Workshops; NEW HomeBaking.org web site.
5. Annual Baking Educator Award and HBA Annual member meeting to provide consumer baking updates and member networking. **Please Attend:**

Relevance:

- Educators at-home, in schools and out-of-school community programs are encouraged provide STEM related educational opportunities. Baking is rich with STEM + Art (STEAM) connections and offers a perfect opportunity to educate Pre-K to Adult re: wheat science, gluten's role in baking science, GMO facts, gut health and wheat foods' nutritional value.
- Home baking activities provide the base knowledge consumers need about wheat food ingredients, science, functional literacy and math. Knowledgeable wheat food consumers who bake, even infrequently, are less vulnerable to urban wheat food myths.
- More than 20 Pre-K-12th grade core education, Family & Consumer Sciences and Culinary Career & Technical education standards are linked in HBA baking labs and activities.
- The connection between personal culinary skills and reducing the risks for obesity in youth continues to mount, with physicians and health educators seeking to add food skill education for youth. It's time to stop blaming wheat foods for U.S. weight problems.
- When "healthy foods" are recommended, fruits and vegetables will be top-of-mind or primary to consumer messaging. Wheat foods need become top-of-mind, and DIY baking helps.

- The need for Flour Food Safety home education is a high priority of the wheat production, milling and baking industry. HBA has a unique position in disseminating resources to educators and NWB support will be applied to this effort.

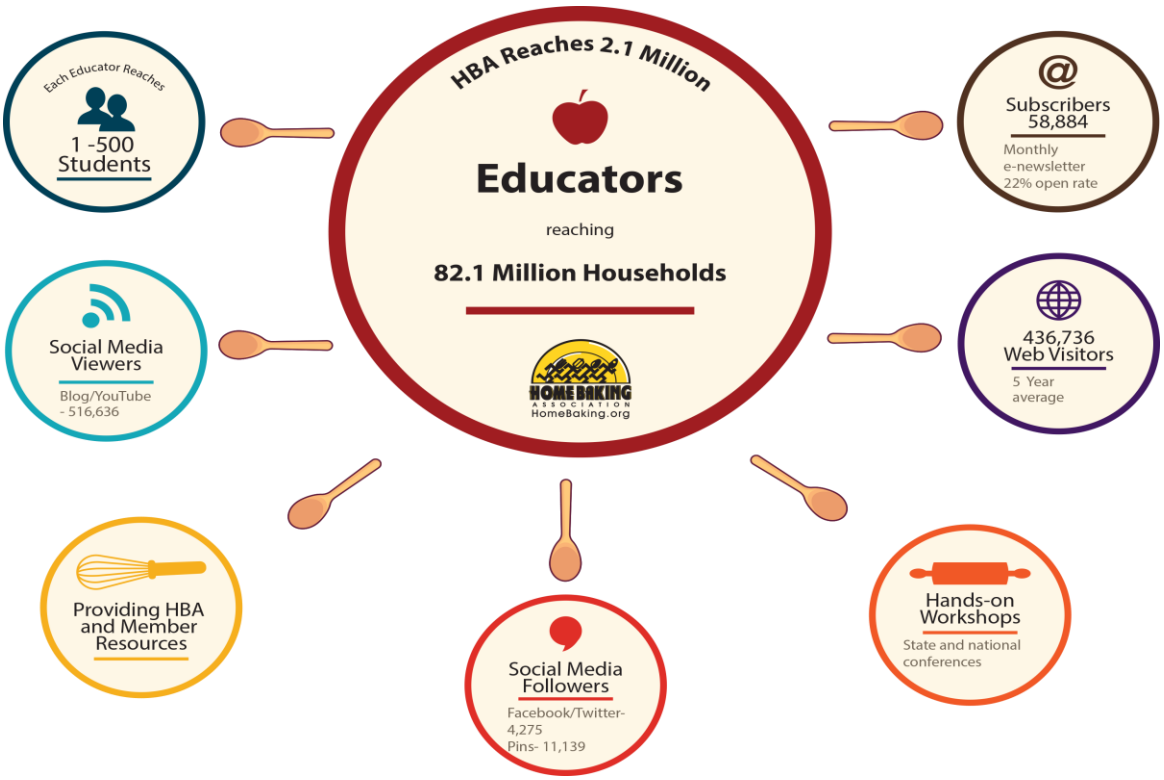
Impact: HBA brought baked goods and grain foods—enriched and whole wheat—"to the table" with over 2.1 MM child nutrition, foods and health educators in 2017 reaching over 82 MM households.
(Reach is calculated by educator reported student/HH numbers: Example: When HBA reaches 1,750 Nebraska FCS classroom foods educators, NWB and HBA know we reach a reported 450,000+ households)
Goal: Expand this reach a minimum of 10% in Program Year 2018.

Method suitability: The non-profit status of the Home Baking Association is welcomed by educators, allowing trade associations and the millers you sell wheat to have a presence in classroom and out-of-school program education. HBA continually seeks partners who extend HBA visibility and applications with actual hands-on baking opportunities.
HBA "teaches youth food educators with the potential to put the flour in the bowl, dough in the oven and bread on the table" and so is ***actual*** and not ***virtual***. HBA, with our members and educator partners, goes beyond the goals of broad "impressions" to achieve the goal of actual wheat flour use and purchases.

Budget: The HBA FY2017 Budget report for $221,368 has been provided to all members including the NWB representative.

- Budget is supported by 36 corporate and trade association members *plus* the NWB
- Membership list is included with this proposal
- A full reporting of FY2017 budget and program has been provided to NWB representative, Royce Schaneman, Executive Director
- HBA employs two part-time staff, Charlene Patton, Executive Director and Sharon Davis, Program Development Director; and consultants Nicholas Beatty, Web-site manager and Kim Fields social media
- No PR firm is employed and staff are equally involved in executing program as well as providing program research, planning, development and reports to members
  Budget Breakdown: Programs 69%; Membership 12%; Administration 10%; Meetings 9%,

Respectfully submitted by Sharon Davis, Director, Home Baking Association Program Development



Media Proposal for Nebraska Wheat Board

Here are several options for you to consider for marketing to the ag industry. Each opportunity has a value of its own.

Midwest Messenger Wheat Emphasis- May 11 & 18. This is a portion of the Midwest Messenger and gives you full circulation in each of the three Nebraska zones. You would be place by the stories around Wheat.

Midwest Messenger Wheat Guide -August 3 & 10. This is a target piece inserted into the Midwest Messenger to Wheat Producers. A great target piece showing yields of test plot results

Farm Safety- September 14 & 21. Once again, this is a portion of the Midwest Messenger and gives you full circulation and a branding recognition supporting the safety of our farmers. Not only do you get full page full colored ads but you can have your logo on all pages if you choose to be a sponsor.

New Bullseye Digital Program

- 25,000 online impressions
- Targeted to Wheat Producers
- 250+ Acres Wheat Producers in the state of Nebraska
- Programmatic ads running on national network of sites but only targeted at this dem
- These are MWM readers who we know the exact demos on… we can now hit with a digital message. These are exclusive demos that no one else has

Half Page ad in Wheat Emphasis in North, South & West Editions would be - $2250

Wheat Guide – Full Page full colored ad is $1696

Farm Safety – Full Sponsorship is $5,000 but you can also do half page ad for $2250

Bullseye Digital Program - $500/month

I have attached a flyer for the Wheat Guide and Farm Safety showing other ad sizes and prices.
The Midwest Messenger has been serving the ag industry for 50 years and is the best read ag publication in Nebraska. We are proud to have worked with the Wheat Board in the past and look forward to continuing this working relationship. The Midwest Messenger can be the butter on the wheat bread.

Thank you for your consideration.

Deanna Ray | Sales Manager
Cell: 402-427-5398 | Home: 402-685-5165 | Office: 402-374-2225, Ext. 320 | deanna.ray@lee.net
707 S. 13th Street, P.O. Box 239, Tekamah, NE 68061 | www.midwestmessenger.com

Seed Guide
2018 WHEAT

Nebraska & Kansas Seed Guide

Delivered to 20,000 Wheat Producers in Nebraska and Kansas

Publication Date August 10 & 17, 2018
Copy Deadline July 27, 2018

The Wheat Seed guide will be distributed to all wheat producers in Nebraska, Kansas and Oklahoma.

SIZE	DIMENSIONS	PRICE
Full Page	9.67" W x 10" D	$ 1,446^{00}
1/2 Page - vertical	4.77" W x 10" D	$ 723^{00}
1/2 Page - horizontal	9.67" W x 5" D	$ 723^{00}
1/3 Page	4.77" W x 7" D	$ 500^{00}
1/4 Page	4.77" W x 5" D	$ 411^{50}
Business Card	4.77" x 2" D	$ 230^{75}

Add Full Color $250

K State & UNL Seed Plot Results

K-STATE Research and Extension

Nebraska Extension

Midwest Messenger

800-888-1380 support@midwestmessenger.com www.midwestmessenger.com

Farm Safety Special Edition

On 9/14 & 9/21 Midwest Messenger will publish a special issue focused on Farm Safety. We will be celebrating Farm Safety week (9/16-9/23) and work to promote awareness of many issues farmers face while on the operation. We will cover topics like health insurance for farmers, mental health, equipment safety improvements, techniques for staying safe and statistics related for farm safety. Again, the overall goal of this special issue is to bring extra awareness to farmers about staying safe and healthy while on the farm.

Midwest Messenger and Today's Producer will publish a special preview section on 8/24 & 8/31. This will give some snapshots on the upcoming special edition.

Special Sponsorship – Help promote farm safety while branding your company a supporter of farmers, ranchers and workers in the industry. This is an excellent large scale opportunity to show your support.

-Sponsor will be a category exclusive opportunity with no other sponsors in the same business category (i.e. hospital, implement, insurance)
-Special edition will be branded and "brought to you" by these exclusive sponsors

Package Details

- 10 Full Page, Full Color Ads
  - 8/25 – South Edition Preview Section
  - 8/25 – East Edition Preview Section
  - 9/1 – North Preview Section
  - 9/1 – West Preview Section
  - 9/1 – Today's Producer Preview Section
  - 9/8 – South Edition Farm Safety Special Issue
  - 9/8 – East Edition Farm Safety Special Issue
  - 9/15 – North Edition Farm Safety Special Issue
  - 9/15 – North Edition Farm Safety Special Issue
  - 9/15 – Today's Producer Farm Safety Special Issue
- Logo on all marketing materials and ads leading up to Farm Safety Week
- 50,000 online impressions on midwestmessenger.com and todaysproducer.com promoting farm safety sponsors
- Logo on the top of every page of Special Farm Safety Special Issue Section (see sample)
- Logo on the front cover of special edition with other 4 sponsors

Package Valued Over $25,000

Special Sponsorship Rate: $5,000

(billing can be split $2500 in August, $2500 in September)

Marketing Proposal for…..

The Nebraska Wheat Board

Renewal Funding Request for **Marketing Nebraska Developed Wheat, Barley and Triticale Varieties**; July - September 2018

On behalf of the Nebraska Crop Improvement Association, and Husker Genetics we request funding for 2018 for print media and distribution to promote the use of wheat varieties that were developed by the University of Nebraska.

Objective: Provide print media to growers, in Nebraska and surrounding states, with yield and quality information on Nebraska developed varieties. These brochures will contain information for a grower to determine if Nebraska developed varieties will work for their operation.

Information will be distributed through direct mailings and handouts at field days that attract wheat growers.

The requested funding from the Nebraska Wheat Board is **$22,500.00,** which will fund 13,000 sixteen/ twenty-page booklets (sheet size is 8½ x 11) for direct mail to small grain growers. With an improved mailing list (working with the Midwest Messenger) we will reach 7,496 growers in NE, 2676 in KS, 910 in CO, 191 in WY, and 748 in SD. The brochures will reach over 12,000 growers. The remainder of the booklets will be used as handouts at field days and other ag events.

13,000 Booklets Costs
Design & Printing - $15,000.00
Postage - $7,500.00

Funding Request-Nebraska Wheat Board $22,500.00
Nebraska Crop Improvement Association will work with the printers and provide name list for NE, CO, KS, SD, and WY for the mailings.
Husker Genetics will provide data comparison of varieties for booklets.

The Nebraska Wheat Board will be recognized as a major sponsor of this program, along with the Nebraska Crop Improvement Association and Husker Genetics on all written materials.

Project Coordinator: Steve Knox, Nebraska Crop Improvement Association, P.O. Box 830911, Lincoln, NE 68583-0911. Phone - 402-472-1444, Fax – 402-472-8652, Email – sknox@unl.edu

AFAN Funding Request
FY 2018-2019 Funding

o **Title of Project**: General AFAN Funding
o **Type of Project:** Publicity and Education
o **New or Renewal**: Renewal
o **Total Amount Requested**: $1,000.00
o **Project Duration**: July 1, 2018 – June 30, 2019.

o **Project Coordinator:**

Kristen Hassebrook, Executive Director
PO Box 84606
Lincoln, NE 58501
Phone: (402)421-4455
Fax: (402) 421-4427
E-mail: kristenh@a-fan.org

o **Organization:**

Alliance for the Future of Agriculture in Nebraska (AFAN)
PO Box 84606
Lincoln, NE 58501
Phone: (402)421-4455
Fax: (402) 421-4427
E-mail: kristenh@a-fan.org

o **Additional Participating Institutions**: *If additional organizations or institutions will be participating on the project, list the key individuals and provide complete contact information.*

Nebraska Soybean Board
Victor Bohslavsky, Executive Director
3815 Touzalin Ave, Suite 101
Lincoln, NE 68507
(402) 441-3240

Nebraska Poultry Industries
Kathi Schildt, Executive Director
521 First St
Milford, NE 68405
(402) 761-2216

o **Project Abstract**: *This will be a brief summary (150 words or less) of the proposal which should include a description of the project and the proposed research methods*.

AFAN has new workshops rolling out this year. Below are two examples.

1. Producer Empowerment Workshops. Attendees are led by a trained facilitator through AFAN's Community Conversations Toolkit and Know Before You Build Toolkit. These toolkits focus on helping producers to tell their stories of livestock development, provide resources and best practices for communicating with neighbors, media and interested stakeholders, provides producers with a basic understanding of their local county zoning permit process and how to prepare and work with the county to obtain the necessary permits.
2. Is Livestock the Answer sessions. This session provides a step by step look at the option of adding livestock to an operation. A walk-through map helps attendees take notes on the different aspects of each livestock species to determine if adding livestock to their operation is something they should seriously consider.

o **Project Outcomes**: *Provide a narrative that lists the projects outcomes (knowledge or actions) as a result of the project.*

Attendees of the Producer Empowerment Workshops will leave with the necessary tools and resources to communicate about their proposed project, build grassroots support and successfully navigate any local zoning permitting process. Attendees of the Is Livestock The Answer sessions will leave with clear answers and next steps as they work through the initial stages of whether adding or expanding livestock to their operation is the right answer for them.

o **Method or Approach**: *Describe how the project will be implemented, including the general approach, activities, methods, and project inputs*.

The Producer Empowerment Workshops will be implemented at invite only events, this will provide farmers with a smaller group setting so that they feel comfortable asking questions. Our contracted facilitator will provide information on best management practices, neighbor relations and communications as well as walking them through the county permitting process and how to obtain the necessary permits. An industry professional will be providing information on the implementation of the manure management plan and how to explain this information to the county. At the end of the session, during a luncheon, these farmers will have the chance to speak with a livestock producer who has recently built or expanded their facility in order to be properly prepared. There will be take home materials provided for the attendees.

Is Livestock the Answer sessions will be given either in collaboration with a conference or at an individual meeting, depending on the need. This session will be presented by an AFAN staff member and the attendees will be taking notes on a take-home handout which they can then sit down and work through with their family. The presentation and take-home handout will lead individuals through key issues, lifestyle questions and financial considerations with a focus on whether incorporating or expanding livestock into their current operation is the right opportunity.

o **Relevance**: *Describe how the project will solve a problem or address an issue of significance to the Nebraska Wheat Board.*

Throughout the year, the Nebraska Wheat Board will be positively impacted by the opportunity to keep young people on the farm through livestock. By allowing farmers to diversify their row crop operations, including wheat, this will encourage the growth of a strong agricultural industry which is critical to the economic well-being of Nebraska grain producers, communities and business interests across the state. Livestock is a great way to add-value to our grains and gives our young people an opportunity to return to the farm. We believe that livestock adds tax base, economic activity and young families to our rural communities and helps to keep them vibrant.

o **Impact**: *Tell who will benefit from the project and how.*

Any farmer or rancher who is looking to either build a new facility or thinking of expanding their current one will benefit from these workshops. By providing as much background information on the decision of adding livestock to the operation through Is Livestock the Answer or preparing for the task of county public hearings through the Producer Empowerment Workshops, we want our producers to feel comfortable and confident. Through the growth of the livestock industry, we will see the return of young people to their rural communities and therefor the continued success of those counties.

o **Method Suitability**: *Explain why the project's approach or methodology is appropriate, as well has how it is better than other methods.*

AFAN has extensive experience training individuals on communication strategies as well as navigating county zoning. In our experience small groups with lots of opportunity for dialogue and questions is the best way to facilitate honest and productive discussions. This is why both these programs have been designed in this manner. Both of the programs have also been designed to provide hands on tools and take-home pieces that individuals can actually use as they implement the teachings of the workshops. It has been AFAN's experience that tools rather than just handouts are the best way to empower individuals after they leave the learning setting.

Budget

The total budget for hosting, staffing and miscellaneous expenses is expected to be approximately $15,000. Nebraska Soybean Board committed $38,000 toward the development of the Producer Empowerment Workshop curriculum. Nebraska Poultry Industries committed $15,500 for the printing of workshop materials and binders for attendees.

2018 Funding Proposal

Project: Nebraska Grain and Feed Association Summer Convention

Total Amount Requested: $1,000

Reason: At our 43nd Annual Summer Convention on Thursday, August 2, 2018, attendees will be presented with information that pertains to the wheat industry as part of the dealers' program. This is an educational component of our meeting featuring current market trends and other valuable grain and feed industry information.

The amount requested $1,000 or an amount approved by the Nebraska Wheat Board would partially cover speaker costs which have averaged about $2,500 in the past. Contributions to cover the cost of speakers keeps attendees' expenses affordable. We anticipate matching contributions from other hosts, including other Nebraska commodity boards.

Contributing organizations will receive a complimentary registration and be recognized on NeGFA electronic and paper promotional materials leading up to and during the Summer Convention. Contributors will also be recognized on placards at the event. Wheat board leadership and staff are invited to discuss current industry issues and to network with our members and speakers.

About Us: The Nebraska Grain and Feed Association (NeGFA) represents more than 85% of the commercial grain storage capacity in the state, as well as most licensed and bonded grain dealers in Nebraska. For the past 121 years, the association has been providing members and producers with valuable information impacting Nebraska's grain and feed industry.

We appreciate the board's consideration of our request and the support the association has received - from the Nebraska Wheat Board in the past. We look forward to a continued fruitful relationship in our shared efforts to support production agriculture in Nebraska.

Sincerely,

Kristi Block,
Executive Vice President
Nebraska Grain and Feed Association

Proposal to the Nebraska Wheat Board
From the Grain Foods Foundation
Submitted: February 2, 2018

Title of Project: Grains Are Good for Healthy Aging: Grain Foods Foundation Research Awareness Initiative

Type of Project: Publicity and Education

New or Renewal: New — The Grain Foods Foundation has received funding from Nebraska Wheat on a near-continual basis for initiatives to support public awareness and consumer education about the benefits of wheat-based foods. Our project was not approved for funding in 2017, however.

Total Amount Requested: $5,000

Project Duration: Three months (anticipated late 2018, beginning in August)

Project Coordinator:
Erin E. Ball
Director, PR and Science
Grain Foods Foundation
601 Pennsylvania Avenue NW
Suite 230
Washington, DC, 20004
Office: (202) 289-6119 ext. 201
eball@grainsfoundation.org

Organization Details:
Grain Foods Foundation
601 Pennsylvania Avenue, NW
Suite 230
Washington, DC 20004
Phone: (202) 289-6119
info@grainsfoundation.org

Abstract (150 word maximum):
As the Grain Foods Foundation continues to invest in research to understand the health benefits of wheat-based foods, we will use funding from the Nebraska Wheat Board to implement a strong, multifaceted communications approach for our second consecutive year participating in Healthy Aging Month in September. This approach will encompass the following communications tools to elevate consumer perceptions of wheat-based foods:

- **Press Release Distribution**: Issue a formal press announcement about the key messages and findings of continuing data analysis to generate media interest and secure coverage for wheat foods' essential and unique roles in healthy aging.
- **Proactive Media Relations:** Engage in targeted media outreach to amplify the reach of the analysis and messaging (i.e., interviews, contributed articles, etc.).
- **Infographic**: Create a custom asset to visually depict the analysis findings using colorful illustrations and consumer-friendly messages. This will be shared across social channels by GFF and the industry and used in education efforts with healthcare professionals, policymakers and consumers. (Examples in Appendix A)

Project Outcomes:
This effort will educate influencers and consumers about the nutritional value of wheat-based foods for the specific population of Americans aged 50 and older and elevate consumer perceptions of the entire grains category. Our work will also provide the industry with additional data-driven facts about the benefits of wheat-based products as well as visual assets that can be leveraged for marketing and promotional purposes.

Approach:
For several years, the Grain Foods Foundation has been investing in data analysis research to evaluate the contributions of wheat-based foods to the American diet. As this analysis has been completed, we have begun to extract messages for specific populations and execute specific outreach to share and magnify these messages. We did some "test and learn" work around Healthy Aging month last year and would very much like to expand that effort in 2018.

The next step for this project involves the development and implementation of a proactive communications program, including the creation and distribution of a press release, proactive media relations and the development of an educational infographic. All of the assets created to promote our research findings will be shared with the industry as tools for their own communications efforts.

Relevance:
As the Nebraska Wheat Board and the grain foods industry as a whole continue to combat elimination-style diets (i.e., gluten-free, paleo, no carb), this research and communications endeavor will help to dispel consumer misconceptions and misinformation by providing data-driven findings that showcase the health benefits of including wheat-based foods in the diet. Further, as the American population of "50-and-overs" continues to live more active and healthy lives, these

healthy aging messages need to be targeted to this community and translated for their health and fitness goals and practices.

Impact:
This communications effort will benefit the entire industry by educating consumers and raising the profiles of wheat-based products.

Method Suitability:
Over the years, GFF has refined its strategic approach to research communications. The combination of media relations, asset development and industry resources has yielded optimal benefit, as it allows us to share research findings (in this case, data analysis and subsequently developed messages) through traditional media channels, across social channels and with peers in the industry to better inform the public.

Budget:
The Grain Foods Foundation requests **$5,000** in support of the healthy aging data analysis research communications strategy. These funds will go directly toward the dissemination of the infographic ($3,500) and press release ($1,500). Grain Foods Foundation will be responsible for the additional costs associated with the development and distribution of these materials, including, but not limited to, staff time and creative development.

About GFF

Who we are:
GFF was established in 2004, during the height of the Atkins Diet's popularity, to stop the decline in wheat foods consumption. In contrast to most commodity boards, we are not funded through a check-off program, but by voluntary contributions from approximately 130 investors from the baking, milling and allied industries and their respective association partners.

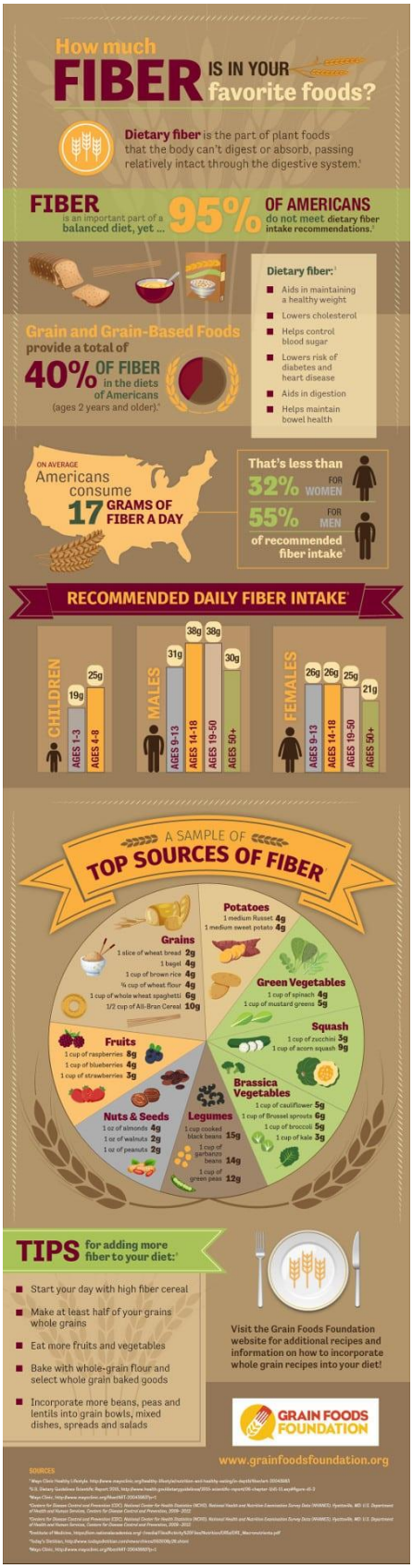
Our mission:
The Mission of GFF is to support and grow the consumption of wheat-based foods by promoting the nutritional benefits of our investors' products through PR and social media efforts fueled by an ongoing research pipeline working to further educate the scientific community, health influencers, and consumers about the essential role of wheat-based foods in the American diet.

We appreciate your continued support of the Grain Foods Foundation and look forward to the opportunity for continued collaboration.

Appendix A:
Examples of previous research infographics

NEBRASKA WHEAT

GRAIN FOODS FOUNDATION



Get to know THE GOOD IN GRAINS

SOURCE: Centers for Disease Control and Prevention (CDC). National Center for Health Statistics (NCHS). National Health and Nutrition Examination Survey Data (NHANES). Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2009–2012.

GRAIN FOODS FOUNDATION

FOR MORE INFO, VISIT WWW.GRAINFOODSFOUNDATION.ORG

Empty Bowls

A Fundraiser for the Food Bank of Lincoln

...alleviating hunger in Southeast Nebraska

Alleviate hunger in Southeast Nebraska and positively impact children, families & seniors

Tuesday, May 29, 2018

11 a.m.-1 p.m.

Each spring, more than 1,000 Food Bank supporters come to Embassy Suites for a chance to enjoy soup from 15 of Lincoln's finest restaurants. Each attendee also leaves with their own personally selected, handcrafted stoneware bowl. The bowls are created and donated by local artist Kathleen Grossman and the friends/students of Down Under Pottery.

The "empty bowls" are a reminder of the many bowls we have filled, and the bowls we still need to fill to help the 60,020 individuals in Southeast Nebraska who struggle with hunger and food insecurity.

We hope you will consider being one of our great sponsors. Your support directly feeds children, families and seniors who are struggling to put food on their own table.

Food Bank OF LINCOLN

Empty Bowls

A Fundraiser for the Food Bank of Lincoln

...alleviating hunger in Southeast Nebraska

2018 Sponsorship Opportunities

Soup Kitchen Partner* $5,000

Provides approximately 15,000 meals for those in need

- Sponsorship credit on all event tickets
- Mention in all news releases related to the event
- Sponsorship credit on all Food Bank of Lincoln social media channels
- Recognition on tables and in event slideshow
- Webpage exposure and links to your webpage if desired
- 20 tickets to the event

Optional: Sponsors at this level are welcome to provide a company banner to be displayed in the atrium of Embassy Suites. If you elect to apply this benefit, we must have your banner by Noon on Wednesday, May 23.

*Soup kitchen partners may also enlist two members of their team to help the restaurants serve soup at the event for additional company promotion.

Soup Bowl Partner $2,500

Provides approximately 7,500 meals for those in need

- Sponsorship credit on all Food Bank of Lincoln social media channels
- Recognition on tables and in event slideshow
- Webpage exposure and links to your webpage
- 15 tickets to the event

Optional: Sponsors at this level are welcome to provide a company banner to be displayed in the atrium of Embassy Suites. If you elect to apply this benefit, we must have your banner by Noon on Wednesday, May 23.

Soup Ladle Partner $1,500

Provides approximately 4,500 meals for those in need

- Recognition on tables and in event slide show
- Webpage exposure and links to your webpage
- 10 tickets to the event

Soup Spoon Partner $750

Provides approximately 2,250 meals for those in need

- Recognition on tables and in event slide show
- 5 tickets to the event

Empty Bowls

A Fundraiser for the Food Bank of Lincoln

...alleviating hunger in Southeast Nebraska

2018 Sponsorship Commitment Form

Sponsor Contact:

Name:_____

Company:_____

Address:_____

Phone:_____ Company Website:_____

Level of sponsorship:

_____Soup Kitchen $5,000 _____Soup Bowl $2,500

_____Soup Ladle $1,500 _____Soup Spoon $750

Contact for follow-up coordination:

Name:_____

Address:_____

Email:_____ Phone:_____

Method of Payment:

_____Please send me an invoice.

_____Check is enclosed.

_____Please charge my credit card.

Credit Card Information

_____MasterCard _____VISA _____Discover

Card Number:

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Expiration Date:_____/_____ Sec. Code:_____

Name on Card:_____

Please return this form to:

Corrine Gernhart
Food Bank of Lincoln 4840 Doris Bair Circle, Ste. A Lincoln, NE 68504
Email: cgernhart@lincolnfoodbank.org Fax: 402.466.6124 Phone: 402.466.8170 ext. 121

Please email us your logo in jpeg format by 3 p.m. on May 1, 2018.

NEBRASKA
Good Life. Great Roots.
DEPARTMENT OF AGRICULTURE

Pete Ricketts, Governor

February 7, 2018

Nebraska Wheat Board
301 Centennial Mall South
Lincoln, NE 68509

Dear Mr. Schaneman:

The Nebraska Department of Agriculture submits the following contract proposal to provide fee collection, budget and accounting, and auditing services for the fiscal year 2018-2019.

Contract Service	Contract Amount
Fee Collection	$ 2,100.00
Budget and Accounting	$ 10,725.00
Auditing	$ 2,075.00
Total Administrative Contract	$14,900.00

Attached is a detailed breakout for each contract service listed above. The contract proposal would operate on an actual cost reimbursement basis, not to exceed the contract amount.

The cost for fee collection and auditing is based on a pro rata share of corn, wheat, and grain sorghum, participating in this function.

If you have any questions, please contact Chris Barber or me.

Sincerely,
DEPARTMENT OF AGRICULTURE

Steve Wellman
Director

Department of Agriculture
301 Centennial Mall South, PO Box 94947
Lincoln, NE 68509-4947

nda.nebraska.gov

An Equal Opportunity Employer

Steve Wellman, Director
Office 402-471-2341 Fax 402-471-6876

WHEAT BOARD
FY 2018-19
CONTRACT PROPOSAL

Fee Collection

Personal Services:		
Salary	1,050	
Benefits	300	1,350
Operating:		
Postage	250	
Telephone	100	
Data Processing	125	
Printing	25	
Office Rental	200	
Office Supplies	25	
Miscellaneous	25	750
Travel:		
Board and Lodging	0	
Auto Rental	0	0
Total		$ 2,100

Budget and Accounting

Personal Services:		
Salary	7,500	
Benefits	2,000	9,500
Operating:		
Telephone	200	
Data Processing	850	
Office Rental	125	
Miscellaneous	50	1,225
Travel:		
Board and Lodging	0	
Auto Rental	0	0
Total		$ 10,725

Auditing

Personal Services:		
Salary	900	
Benefits	250	1,150
Operating:		
Postage	25	
Telephone	100	
Data Processing	100	
Office Rental	250	
Miscellaneous	50	525
Travel:		
Board and Lodging	200	
Auto Rental	200	400
Total		$ 2,075
Grand Total		$ 14,900

2018 Wheat Quality Survey
And Administrative Proposal

Nebraska

$12,972.00

Mark Hodges, Director, Plains Grains, Inc., 127 NRC, Stillwater, OK 74078, is the contact for this project and can be reached electronically at hodgesm1@cox.net or at 405-249-4817 or 405-744-9333. **This proposal is a request for renewal.**

Plains Grains, Inc.

Mission

Plains Grains, Inc. (PGI) is a non-profit organization that works to enhance Hard Red Winter (HRW) wheat marketing activities and to insure US Wheat Associates (USW) has all the information necessary to successfully market HRW on a world-wide basis. It is this organization's belief that the best way to accomplish this is to provide end-use quality data to the customer through extensive testing. This data is obtained through the PGI HRW Wheat Quality Survey. The mission of the survey is to provide each state with state specific data as well as regional data. This data will be formatted in such a way that it can be used to market wheat to foreign and domestic buyers, and it can be used to show producers the quality in the state and region. The data is also shared with US Wheat Associates for their marketing activities internationally, including inclusion in the USW Annual Crop Quality Report.

Project Narrative

In 2006, PGI began working with states in the HRW wheat production region to develop grainsheds (reporting areas). A terminal elevator (with 50 – 110 car or shuttle) facility and the production region that supplies that facility are considered a grainshed. Currently, 48 grainsheds have been defined in 12 states from Texas to PNW. For the 2018 Wheat Quality Survey, PGI will pull samples from each of these grainsheds. **Estimated number of individual samples for the 2018 survey is 533, with a maximum number of composites of 192.** Composites will be made from the individual samples within a grainshed divided into potentially 3 groups based on protein, then an overall individual grainshed composite. **A minimum of 20% of the individual samples must make up a protein level to be separated out into a protein level. The protein splits are: below 11.5%, 11.5% – 12.5% and above 12.5%.**

Samples from all states will be collected and sent to the lab for evaluation. Individual and composite samples will be sent to an official grain inspection service for testing as outlined below. The forwarding of those tests will be done in an Excel spreadsheet to US Wheat and PGI in a timely manner.

Test results will be compiled and summarized on a weekly basis using a Microsoft Excel spreadsheet, that information will then be submitted to US Wheat and PGI in an electronic format. The testing lab will be responsible for developing a final report that includes a comprehensive analysis of the information, regional summary tables and tied to the USDA, NASS 5 year average production within each grainshed. The report will be the product of extensive consultation by the lab, US Wheat & PGI and is due no later than October 1, 2018.

Reporting:

- Weekly reports submitted to PGI and USW in electronic format with individual test results and a current narrative summarization of testing and progress and forwarded to PGI states.
- Testing reports will be in a Microsoft Excel format and narrative reports will be in a Microsoft Word format.

- The final report will include all testing data, regional summary tables based on USDA NASS 5 year average production within each grainshed and a comprehensive narrative analysis of the data.
- All reports will utilize the term "grainshed", but define the term as a "reporting area".
- The final report will be a product of extensive consultation with USW and PGI states.
- Final report due no later than November 1, 2018.

Test to be preformed:

Individual wheat samples (By Official Inspection Service for Grade Factors)

Official Grade
Test weight (lb/bu)
(kg/hl)
Damaged kernels (%)
Foreign material (%)
Shrunken & broken (%)
Total defects (%)
Dockage (%)
Moisture (%)
Protein (%) 12%/0% moisture basis
Ash (%) 14%/0% moisture basis
Single kernel: Hardness
Weight (mg)
1000 kernel weight (g)
Diameter (mm)
Kernel size
Falling Number (sec)
Sedimentation (cc)

Composite wheat samples

Protein (%) 12%/0% moisture basis
Moisture (%)
Ash (%) 14%/0% moisture basis
Kernel Size (%) lg/md/sm
Single kernel: Hardness
Sedimentation (cc)
Lab Mill Extraction (%)

Composite flour samples

Moisture (%)
Protein (%) 14%/0% moisture basis

Ash (%) 14%/0% moisture basis
Wet Gluten (%)
Gluten Index
Color (Hunter L*,a*,b*)
Mixograph
Farinograph
Alveograph
Starch damage
Amylograph
Extensigraph
Falling number
SRC on composites

Baking Evaluation

Loaf Volume (cc)
Crumb Texture (scale 0 to 6) (0 to 10)
Crumb Grain (scale 0 to 6) (0 to 10)

Project Timeline

Sample collection will begin when harvest is 1/3 of the way complete at the sample location. Samples will be shipped or delivered to successful bidder within a week of collection and testing will begin immediately. Individual testing and preliminary results are to be completed by the lab within 30 days of receiving the sample. Composite results should be completed and reported within 30 days after receiving the last sample in that composite grainshed. HRW wheat data will be delivered to US Wheat Associates no later than October 1st, subject to constraints beyond the control of PGI.

2017 Crop Testing information can be viewed at www.plainsgrains.org. 2018 data will also be available as harvest samples are processed and posted (weekly basis).

ADMINISTRATION

PGI will provide administration to include the following services:

1. Management of Crop Quality Testing

    a. Manage the collection of timely, accurate data and the transference of this data to relevant information for distribution to key buyers using the web, email, USW, etc.

b. Manage the development of an educational plan designed to maximize utilization of crop quality data.
c. Customer relations, travel & attend buyer conferences
d. Development of crop quality presentations for use with Trade Teams by state wheat commissions.

2. Strategic Planning

a. Continuation of the development of the Plains states marketing plan.
b. Creation of a plan that defines accountability to Plains board of directors, state Wheat Commissions and has clear measurements of adding value.

3. Development of new methods of marketing and transportation/logistics to key regional markets.

a. Transfer of ownership of varieties (regional development for marketing purposes)
b. Industry/Supply chain partnerships, including other grains and oilseeds (vertical integration when possible, establish a field to fork mentality)

4. Coordination of multi-state research projects

a. Develop educational materials that highlight projects of regional interest.
b. Active consolidation when possible.
c. Develop regional approaches for funding.
d. Actively work with state wheat commissions, WFC, USW and NAWG.

5. Coordination of regional representation of trade shows.

a. Use of baking for promotion utilizing local growers as volunteers.
b. Development of educational materials.
c. Presentation of regional testing and data information.

Projected Cost:

Total Final Cost (matching funds applied) ESTIMATED $12,972.00

WHEAT MARKETING CENTER

Date: February 1, 2018

To: Royce Schaneman, Executive Director
Nebraska Wheat Board

From: Janice Cooper, Managing Director

Subject: 2018 Proposals

Enclosed are three proposals for your consideration:

- **Improving the Competitive Edge of Nebraska Wheat** (General Support)
- **Nebraska Wheat Export and Marketing Workshop**
- **Nebraska Youth Export Seminar**

Wheat Marketing Center is committed to and focused on providing economic value to the farmers of Nebraska. WMC looks forward to working with the Nebraska Wheat Board to maximize the impact of wheat grower dollars.

Thank you for your consideration of these proposals and for the continued strong support from the Nebraska Wheat Board.

Please call me with questions at (503) 295-0823 or email to cooper@wmcinc.org.

CC: Von Johnson

The education and research bridge connecting growers and customers

Nebraska Wheat Board
Request for Funding FY 2018/19

February 1, 2018

Title:	**Improving the Competitive Edge of Nebraska Wheat** (General Support)
Type of Project:	**International Marketing**
Amount Requested:	**$25,000** (Renewal of funding) (2017 and 2016 Funding - $20,000; 2015 Funding - $75,000)
Project Duration:	**Fiscal Year 2018/19**
Project Coordinator:	**Janice Cooper, Managing Director**
Organization:	**Wheat Marketing Center** 1200 NW Naito Parkway, Suite 230 Portland, Oregon 97209 (503) 295-0823 – phone; (503) 295-2735 – fax cooper@wmcinc.org
Cooperators:	Nebraska Wheat Board University of Nebraska

Abstract:
The Wheat Marketing Center (WMC) is dedicated to improving the competitive advantage of Nebraska wheat farmers through education and research. We seek to improve the well-being of present and future generations of U.S. wheat farmers and worldwide consumers by conducting wheat utilization research projects and delivering dynamic educational programs in partnership with other international technical and educational organizations. To meet the needs of the wheat industry, WMC:

- Provides technical training on wheat utilization.
- Conducts objective research on all wheat classes.
- Serves as a bridge between worldwide wheat customers and Montana wheat producers.

- Partners with farmers, wheat processors, U.S. Wheat Associates (USW), the grain trade, wheat breeders, and Federal Grain Inspection Service (FGIS).
- Strives for continuous impact by dynamic response to market fluctuations.

Outcomes:

- Retain current and attract future talented staff with the range of capabilities needed to deliver WMC programs.
- Maintain a viable laboratory with equipment and expertise to demonstrate to the world the functional end-use properties of Nebraska wheat.
- Provide educational opportunities for Nebraska wheat producers, Wheat Ambassadors, and others to learn about wheat quality analysis and its relation to wheat prices and wheat markets.
- Promote the utilization of Nebraska wheat and other U.S. wheat to international and domestic buyers.

Annual Programs and Activities:

Each year, WMC conducts a series of educational and research activities designed to promote Nebraska and U.S. wheat. These activities include:

- Wheat utilization courses for domestic and international participants. These courses are either sponsored by USW, WMC or private companies.
- Crop quality analysis and research presentations at various national and international conferences and seminars.
- Special research projects to address market opportunities, including whole wheat tortillas.
- Close cooperation with University of Nebraska and the Wheat Quality Council to analyze advanced wheat breeding lines and released wheat varieties for finished product characteristics on pilot-scale equipment.
- TCK testing on all wheat going to China.
- Educational seminars for Nebraska and other wheat farmers.
- Export cargo testing to demonstrate wheat and flour quality for key Asian and Latin American customers.
- Participation in USW crop quality process, including contributing data for the annual report and making presentations at the CQ seminars.

Impact:

Even with historically low wheat prices, U.S. wheat is not price competitive. The U.S. wheat industry offers quality and reliability to its customers around the world. Wheat millers and end users are demanding increasingly sophisticated specifications, such as Farinograph water absorption and whole meal wet gluten content.

In this sophisticated marketing environment, U.S. wheat farmers need to know what to grow to meet specifications. The U.S. wheat market needs information about the products that are being made from their wheat. A neutral laboratory setting is beneficial to processors, buyers, sellers, and farmers – the entire wheat value chain.

WMC provides scientific expertise that answers questions, solves problems, and increases profitability for the U. S. wheat industry. WMC staff members are recognized as impartial experts providing relevant and accessible answers to the wheat world. WMC demonstrates the importance and value of quality to customers around the world.

Wheat Marketing Center welcomes the opportunity to assist Nebraska farmers in providing the competitive edge for wheat the world wants to buy.

New Programs / Activities in FY 2017/18

1. **WMC Rebranding and Marketing**
   Educational Displays: The displays in the hallway outside WMC are a key component of its educational mission. New displays were installed to more effectively educate visitors about the story of wheat from farm to table and the role that WMC plays.

   Website: The old website limited WMC's ability to communicate with stakeholders and potential customers. The new website, also launched in October, improves marketing and outreach and enhances WMC's programs.

2. **New Partnerships – in current and new fiscal year**
   WMC has traditionally partnered with charter state wheat commissions, USW and research entities to deliver its educational and research programs. In an effort to expand its outreach and increase its effectiveness, WMC has partnered with new entities, including:
   - U.S. Dairy Export Council – Collaborated on a workshop for Middle East and North African bakers demonstrating inclusion of whey permeate in baked goods, including bagels, cakes, baguettes, and muffins.
   - BAKERpedia – WMC will continue conducting series of "Science of Baking" courses demonstrating new technology and the importance of quality to broad audience of mostly domestic bakers.
   - Bread Bakers Guild of America – Hosted a second course for artisan bakers. BBGA has a large membership of small and medium sized bakeries in the United States and beyond.
   - Wheat Foods Council – WMC was asked to host the WFC summer meeting in June, 2018. We look forward to sharing our facility with other industry leaders.
   - NAWG / National Wheat Foundation – In addition to helping test quality in the National Wheat Yield Contest, WMC is participating in the Wheat 102 educational event on Capitol Hill in February 2018.

Nebraska-Focused Activities and Accomplishments in FY 2017/18

1. **Whole Wheat Tortilla Research Project**
   In partnership with Ardent Mills, WMC hosted a multi-phase research project to improve whole wheat tortillas. The tortilla line, funded by the NWB, made this project possible. Results are pending.

2. **2017 Hard Winter Wheat Tour**
   May 1-4, 2017
   WMC Managing Director Janice Cooper participated in the annual winter wheat tour and will continue to do so on an alternating-year basis. WMC also evaluates samples for the annual WQC meeting in February and presents results. Lab Supervisor Bon Lee and Janice Cooper both attend.

3. **Nebraska Wheat Board Meeting**
   November 2, 2017
   WMC Managing Director Janice Cooper attended the Nebraska Wheat Board Meeting in Lincoln and presented an update on WMC activities and programs. She stayed over for the UNL football game and enjoyed her first runza. Thanks to NWB Executive Director Royce Schaneman and board members for their hospitality.

4. **Wheat Export and Marketing Workshop**
   Due to constraints on NWB's budget, the annual growers' workshop was suspended for 2018. WMC looks forward to hosting this event again when funding is available.

5. **Farmer's Co-op Board Tour**
   February 12, 2018
   The Farmer's Co-op Elevator from Hemingford, NE requested a tour of the Wheat Marketing Center at Royce Schaneman's suggestion. The Board of Directors will tour WMC and learn about its role in the world wheat market as part of a Portland visit.

6. **Youth Export Seminar / Wheat Ambassador Program**
   March 19-21, 2018 (Funding decision still pending)
   WMC is holding these dates for the annual Youth Export Seminar pending a decision on available funding.

Additional Activities in FY 2017/18:

- **Workshops / Briefings:**
  a. Korea Whole Wheat Baking Study Team – July 10-14, 2017
  b. US Dairy Export Council Baking Workshop – July 18-20, 2017
  c. Asian Noodle Technology Short Courses for Africa – July 31 - August 11, 2017
  d. Korea Contracting for Wheat Value Workshop – August 21-15, 2017
  e. Science of Commercial Bread Baking Workshop – November 2, 2017
  f. COFCO Contracting for Wheat Value Workshop – May 7-11, 2018
  g. Asian Noodle Technology Short Course – May 22-27, 2018
  h. Versatile Whole Grain Dough / BBGA – May 31-June 1, 2018
  i. Korea Baking Products Study Team – June 18-22, 2018
  j. Cookie and Cracker Technology Short Course – June 26-29, 2018

- **Regional Crop Quality Presentations**
  a. USW Crop Quality Tour/ China – November 20-30, 2017
  b. PNW Wheat Quality Council – January 22-24, 2018
  c. Wheat Quality Council Annual Meeting - February 20-22, 2018

d. Soft Red Wheat Quality Council – March 13-15, 2018

- **Grower Seminars**
  a. Washington Farmers Workshop – November 29, 2017
  b. Montana Farmers Workshop – December 5-8, 2017/ March 5-8, 2018
  c. Idaho Farmers Workshop - January 15, 2018
  d. Oregon Farmers Workshop – January 18, 2018

Other Programs

- **Trade Teams**
  Wheat Marketing Center presented wheat quality information to USW-sponsored trade teams from many Asian and Latin American countries.

- **TCK Spore Analyses for Wheat Exports to China**
  A TCK certificate is required for all U.S. wheat exports to China. Wheat Marketing Center is the only lab that is certified by Federal Grain Inspection Service (FGIS) to test for TCK spores in U.S. wheat.

- **Wheat Export Cargo Analyses**
  Wheat Marketing Center continues to analyze wheat export samples, including soft white, hard red spring, and hard red winter wheat classes, for international customers. USW maintains the data base.

- **Visiting Scholars**
  Wheat Marketing Center hosted two visiting scholars and one PhD student research assistant to assist with WMC educational programs and research projects.

Conclusion:
The Wheat Marketing Center serves as a bridge between wheat producers and wheat customers around the world. The success of the U.S. wheat industry relies on effectively conveying the value of the quality of our wheat. WMC plays a key role in demonstrating the importance of quality to end products through its diverse and dynamic research and education programs.

Funding Request: $ 25,000
To provide general support for salaries and programs.

Nebraska Wheat Board
Request for Funding FY 2018/19

February 1, 2018

Title: **Wheat Export and Marketing Workshop**

Type of Project: **Education**

Amount Requested: **$ 8,000 (Renewal of funding)**
(2017/18 Funding suspended due to budget;
2016/17 Funding - $8,000)

Project Duration: This activity is usually conducted in early January

Project Coordinator: **Janice Cooper, Managing Director**
Organization: **Wheat Marketing Center**
1200 NW Naito Parkway, Suite 230
Portland, Oregon 97209
(503) 295-0823 – phone; (503) 295-2735 – fax
cooper@wmcinc.org

Abstract:
The Nebraska wheat industry is a major competitor in the global wheat industry. The Wheat Export and Marketing Workshop educates wheat producers, elevator operators and other wheat professionals about the end-use demands of domestic and international wheat buyers. Financial success in global markets relies on meeting the demands of buyers. This workshop provides the opportunity to gain knowledge about the market's complexities.

Outcomes:
Gain knowledge tools to increase farm profitability by:

- Touring wheat export facility and wheat foods processing factories.
- Learning about the milling process and wheat and flour quality testing methods.
- Observing and taking part in cookie and cracker, Asian noodle, steamed bread, tortilla, and Middle Eastern flat bread production.
- Learning about the functions of Federal Grain Inspection Services and the respective roles of U. S. Wheat Associates, grain traders, and transportation providers.

Approach:

- Nebraska Wheat Board encourages farmers, elevator operators, and others to attend the Wheat Export and Marketing Workshop at Wheat Marketing Center.
- Wheat Marketing Center organizes and conducts the workshop, including tours of wheat export and processing facilities.
- Wheat Marketing Center explains wheat and flour testing and evaluation equipment and provides hands-on wheat foods production demonstrations.

Timeline:

Nebraska Wheat Board organizes their annual "Wheat Export and Marketing Workshop" at Wheat Marketing Center, Portland, Oregon, in early January. It usually overlaps with the Idaho Wheat Commission annual growers' workshop.

Relevance:

The wheat industry becomes more complex and competitive all the time. Consumers, both domestic and international, demand wheat with quality characteristics that meet their processing needs. This workshop provides Nebraska farmers and other industry leaders with tools to understand and successfully compete in the global marketplace.

Impact - Report of Accomplishments: (2018 tour suspended due to budget constraints)

In January 2017, Wheat Marketing Center conducted the annual Wheat Export and Marketing Workshop for five farmers, two merchandizers and two reporters from Nebraska. On the first day, participants joined Idaho wheat farmers in a Wheat Forum focused on transportation and world market challenges. The next day, they learned about wheat and flour quality testing as well as the production of cookie and crackers, Asian noodles, steamed bread, tortillas, and Middle Eastern flat breads. The group also toured Columbia Grain export facility, Shin Shin Foods Noodle Company and heard from Greg Guthrie of BNSF. After "enjoying" a surprise snow day, they visited FGIS for a grain grading demonstration and discussed international markets with USW's Steve Wirsching.

Participants reported the tour was well organized and very informative, and said the program broadened their views and perspectives on the wheat export market. This year's tour had a particularly large impact due to the participation of the two reporters from Pure Nebraska (1011 News). Taryn and Jon Vanderford produced several stories about Nebraska's connection to WMC and the many places they visited, which aired on local television. This coverage benefited the Nebraska Wheat Board as well as Wheat Marketing Center.

FY 2016/17 Budget:

Expenses included:

Lodging	$ 4,850
Food	$ 1,720
Transportation	$ 680
Total	**$ 7,250**

Actual expenses are paid by WMC and reimbursed by NWB. The original budget was for $8,000. Excess funds are retained by NWB.

Actual expenses are paid by WMC and reimbursed by NWB. Unspent funds are retained by NWB.

Budget Request for 2018

Estimated expenses for five participants include:

Lodging:	$3,000
Meals:	$1,000
Transportation:	$ 500
Total:	**$4,500**

Conclusion:

These trips provide a lot of value for the future leaders in agriculture. Not only is their knowledge of wheat broadened greatly, but they see many potential career paths by visiting so many different entities. The impact of the 2017 tour was enhanced by the participation by a local reporter, who followed up with at least several stories about the tour.

Nebraska Wheat Board
Request for Funding FY 2018/19
February 1, 2018

Title: **Nebraska Youth Export Seminar**

Type of Project: Education

Amount Requested: **$4,500** (Renewal of funding)
(2017 Funding - TBD; 2016 Funding - $6,000)

Project Duration: This activity is conducted in March to coincide with Spring Break at University of Nebraska, Lincoln

Project Coordinator: **Janice Cooper, Managing Director**
Organization: **Wheat Marketing Center**
1200 NW Naito Parkway, Suite 230
Portland, Oregon 97209
(503) 295-0823 – phone; (503) 295-2735 – fax
cooper@wmcinc.org

Abstract:
The Nebraska wheat industry is a major competitor in the global wheat industry. The Youth Export Seminar educates Nebraska Wheat Ambassadors on the complexities of the wheat value chain, and especially about the end-use demands of domestic and international wheat buyers. Financial success in global markets relies on meeting the demands of buyers. This workshop helps prepare future wheat farmers and grain industry executives for their careers.

Outcomes:
Gain knowledge and develop leadership skills by:

- Touring wheat export and wheat foods processing facilities.
- Learning about the milling process and wheat and flour quality testing methods.
- Observing and taking part in cookie and cracker, Asian noodle, tortilla, and Middle Eastern flat bread production.
- Learning about the functions of Federal Grain Inspection Services and wheat marketing perspective of U. S. Wheat Associates, grain traders, and transportation providers.

Approach:

- Nebraska Wheat Board encourages college students interested in pursuing a career in agriculture to become Wheat Ambassadors. Part of the program is the opportunity to attend the Youth Export Seminar at Wheat Marketing Center.
- Wheat Marketing Center organizes and conducts the seminar, including tours of wheat export and processing facilities.
- Wheat Marketing Center demonstrates wheat and flour testing and evaluation equipment and provides hands-on food production experience.

Timeline:

Nebraska Wheat Board sponsors their annual three-day "Youth Export Seminar" at Wheat Marketing Center in mid-March. The dates are selected to coincide with spring break.

Relevance:

The wheat industry becomes more complex and competitive all the time. Consumers, both domestic and international, demand wheat with quality characteristics that meet their processing needs. This workshop provides Nebraska future leaders with tools to successfully compete in this global marketplace. By interacting with professionals at all levels in the wheat value chain, participants may make more informed career choices.

Impact - Report of Accomplishments:

A decision on whether to conduct the March 2018 program is still pending. Therefore, this proposal includes a report on the FY 2016/17 seminar.

In March 2017, Wheat Marketing Center conducted the annual Youth Export Seminar for two college students from Nebraska (plus one Lincoln-based reporter). Over the three days, participants engaged in a combination of hands-on milling and wheat food activities and interactive lectures from grain marketing and transportation executives. Nebraska youth also toured a wheat export facility, a tug boat company, a noodle company, and a local bakery. They learned about wheat and flour quality testing as well as the production of cookies and crackers, Asian noodles, steamed bread, tortillas, and Middle Eastern flat breads.

The group also visited the Federal Grain Inspection Service office and participated in a grain grading workshop and spent time with Steve Wirsching at USW. Participants reported the tour was well organized and very informative, and said the program broadened their knowledge of and perspectives on the wheat export market.

Wheat Marketing Center organized and the Nebraska Wheat Board sponsored this tour.

Actual Budget for 2016

A budget of $6,000 was approved. With only three participants, expenditures were held to $1,807.

Lodging:	$1,308
Meals:	$ 230
Transportation:	$ 269
Total:	**$1,807**

FY 2018/19 Budget Request:

Expenses included:

Lodging	$ 5,000
Food	$ 2,000
Transportation	$ 1,000
Total	**$ 8,000**

Conclusion:

Wheat Marketing Center has conducted successful tours for the Nebraska Wheat Board every year since 2003 (except 2018). Past participants say that this tour is well known for its educational value. WMC looks forward to the opportunity to arrange another tour in 2019. There are some new stops planned for the tour, including the local Ardent Mills innovation facility and possibly the Food Innovation Center.

The NWB practice of including media professionals like Taryn and Jon Vanderford has been very effective. Pure Nebraska broadcast multiple segments from the 2017 tour, with many topics covered and people interviewed. Links to all the segments are included in the new WMC website as part of the Media Gallery.

National Association of Wheat Growers

415 Second St. NE, Suite 200 • Washington, D.C. 20002 • (202) 547-7800 • www.wheatworld.org

February 1, 2018

Mr. Royce Schaneman
Executive Director
Nebraska Wheat Board
P.O. Box 94912
Lincoln, NE 68509

Dear Royce:

The National Association of Wheat Growers (NAWG) proposes to renew our partnership with the Nebraska Wheat Board for the fiscal year beginning July 1, 2018, through June 30, 2019, at a funding level of $44,000, which reflects the funding formula established by our Board of Directors. Noting the Nebraska Wheat Board's "Program Focus Areas," NAWG's work will encompass multiple program areas but will primarily focus on Policy Development. Please find our funding request enclosed with this letter.

Project Title: Membership in the National Association of Wheat Growers (NAWG)

Project Coordinator: Chandler Goule, CEO
National Association of Wheat Growers
415 2nd Street NE, Suite 200
Washington, DC 20002
Office Phone: 202-547-7800
Fax: 202-546-2638
Email: cgoule@wheatworld.org

As will be elaborated throughout our funding proposal, NAWG will continue to undertake activity in the following general areas with the Nebraska Wheat Board, in conformance with policy set by the NAWG Board of Directors which has ultimate authority over NAWG activities: domestic and trade policy; environment and renewable resources policy; research and technology policy; and public communication and collaboration.

We sincerely appreciate your consideration of this proposal and would be happy to answer any questions you have.

Sincerely,

Chandler Goule

Chandler Goule, CEO
National Association of Wheat Growers

National Association of Wheat Growers
415 Second St. NE, Suite 200 • Washington, D.C. 20002 • (202) 547-7800 • www.wheatworld.org

Proposal to the Nebraska Wheat Board
February 1, 2018
For Funding Year 2018-2019

Title: Membership in the National Association of Wheat Growers (NAWG)

Grantee: National Association of Wheat Growers

Principals:

Chandler Goule, Chief Executive Officer	cgoule@wheatworld.org
Josh Tonsager, VP of Policy and Communications	jtonsager@wheatworld.org
Keira Franz, Environmental Policy Advisor	kfranz@wheatworld.org
Molly O'Connor, Biotech, Food, and Trade Advisor	moconnor@wheatworld.org
Steve Joehl, Research and Technology Director	sjoehl@wheatworld.org
Craig Berning, Government Relations Coordinator	cberning@wheatworld.org
Caitlin Eannello, Communications Director	ceannello@wheatworld.org

National Association of Wheat Growers
415 Second St. NE, Suite 200, Washington, DC 20002
Phone: 202-547-7800 www.wheatworld.org

Project Abstract: Membership in NAWG allows the Nebraska Wheat Board (NWB) to leverage its investment with other state wheat organizations to educate Members of Congress and Administration officials to shape federal policy in Washington, D.C. Joining with 20 other NAWG-affiliated state associations expands the reach of NWB far beyond what it could achieve alone.

On behalf of its state association members, NAWG works on a variety of policy issues with Congress and the Administration. These issues include federal farm policy including development of the 2018 Farm Bill, Farm Bill implementation, crop insurance, trade, environmental regulations, tax reform, conservation programs, disaster assistance, and many others. Priorities and policies are set by NAWG's standing policy committees and NAWG's Board of Directors. NAWG is truly a grassroots advocacy organization, which is one of its greatest strengths.

Nebraska's participation in NAWG helps keep the organization a credible and reliable source of information on wheat issues for policymakers in Washington.

Project Outcomes: NAWG's activities pay dividends back to local farmers in the form of federal farm programs and an effective Farm Bill, representation in Washington on environmental issues such as conservation or crop protection registrations, and in many other forms. NAWG is intimately involved in policy issues before Congress and the Administration and in outreach efforts and coalitions intended to raise awareness of agriculture's positive contributions and to provide evaluation to lawmakers about the impact federal policy proposals would have on wheat farmers across the country. Additionally, NAWG coordinates research efforts through the National Wheat Improvement Committee and pursues funding for key wheat-specific research programs, including the U.S. Wheat and Barley Scab Initiative, through the annual appropriations process and the Farm Bill reauthorization process. Additionally, through the NAWG and National Wheat Foundation (NWF) National Wheat Action Plan (NWAP), the organization

is focused on coordination and collaboration with other members of the wheat value chain, in educating producers about the importance of intensive management practices, and in improving risk management tools for wheat growers. The total value of these activities turns into a significant return on investment annually for Nebraska wheat farmers.

Below is a list of examples of member benefits:

- Entitlement to two seats on NAWG's board of directors, the same representation afforded to all NAWG-state affiliates meeting their full funding commitments.
- Nebraska's directors on NAWG's board have the eligibility to run for elected leadership positions and serve as chairs of NAWG's policy committees and joint committees with U.S. Wheat Associates.
- NAWG amplifies individual states' voices onto a national stage, including the House and Senate Agriculture leadership and their staff.
- Communications and policy staff provide social media toolkits to states on specific topics to the states
- Policy staff provides talking points and background papers to the states for Congressional and Administration listening sessions
- Drafting of opinion editorials and posting of guest blogs for state leaders
- Coordination of Policy Fly-Ins to enable states with small Congressional delegations to have a bigger reach to other states' offices
- Provide policy services to the states covering: Farm Bill Implementation; Farm Bill priority development; Agriculture Appropriations; Trade (examples: NAFTA; Cuba trade; engagement on the pending WTO cases against China's domestic support system); Tax Reform; Transportation (rail, highway, and waterway policy); Infrastructure development; Commodity market regulation; Environmental regulations, including wetlands compliance; Conservation program implementation; Biotechnology regulation; Regulatory framework for new breeding technologies
- Relationships with USDA officials
- CEO Council Representation
- Leadership training programs, including WILOT and WOLF
- National Wheat Foundation Benefits:
    - Glyphosate blog series to address myths about the use of glyphosate on wheat
    - National Wheat Action Plan
    - National Wheat Yield Contest

Method or Approach: NAWG receives its direction from members of state wheat associations via the NAWG Board of Directors. NAWG's positions on issues affecting the wheat industry are outlined in the NAWG Resolutions, as annually amended and approved by the NAWG Board. The organization's strategic direction as set in 2008 incorporates four key objectives:

- Create a unified voice supporting wheat growers that results in positive action
- Improve risk management programs to support U.S. wheat growers
- Increase the focus of capturing the benefits of energy policy
- Encourage investment and innovation in U.S. wheat

Each of these objectives has corresponding measurable goals, including to:

- Improve NAWG/US Wheat relations
- Unify organizations (wheat value chain partners as well as other commodity groups)

- Improve crop insurance programs by lowering the cost to enroll, increase participation rates, and increasing available coverage
- Pursue resources for improvements in U.S. transportation infrastructure
- Maximize opportunities for wheat growers in the next Farm Bill

Each of these goals is delegated to the appropriate policy committees to plan appropriate courses of action, oversee staff implementation and evaluate progress. NAWG has three standing policy committees and two joint committees with U.S. Wheat Associates, as well as committees for operations and planning, budget, nominating and executive functions. The policy committees are detailed below:

- Domestic and Trade Policy, which covers farm programs, risk management, taxes, credit, futures, transportation and trade policy;
- Environment and Renewable Resources, which covers crop protection, conservation, wetlands, water and air quality, endangered species, alternative energy, carbon credits and greenhouse gas offset policy;
- Research and Technology, which covers federal research programs, extension, grain quality and marketing science issues;
- NAWG-USW Joint International Trade Policy, which provides policy recommendations on trade, promotion and food aid to both NAWG's Board and U.S. Wheat's Board; and
- NAWG-USW Wheat Breeding Innovation Committee (formerly the Joint Biotechnology Committee), which provides policy recommendations on new breeding technology issues to both NAWG's Board and U.S. Wheat's Board.

Each of these committees sets overall policy resolutions and goals for priority action on an annual basis. Depending on the issue, members of the committees will be involved in periodic meetings and conference calls with NAWG's staff and officers to discuss policy and operational developments and make decisions.

NAWG provides periodic reports encapsulating the work done by the association during the year. In addition, NAWG provides regular email newsletters with current information on policy issues and NAWG's activities.

Relevance: The current economic conditions have meant that federal farm support programs, the regulatory environment, trade agreements, tax policy, and publicly-funded research are more important now than ever. Congress is working on writing a Farm Bill and the Administration is implementing regulations to implement recently-enacted tax reform legislation, developing an infrastructure package, overhauling the regulatory framework, and renegotiating significant trade agreements. Nebraska wheat farmers are able to have a voice in these issues through continued partnership with NAWG.

Impact: NAWG's work on federal policy will benefit all Nebraska wheat growers. Through the board's grassroots policy development process, we identify policy solutions that will be beneficial for wheat growers across all regions all of the country, and pursue those priorities through both Congress and the Administration.

Method Suitability: NAWG is the only national association representing wheat producers on policy issues. We work closely with other wheat organizations, including U.S. Wheat Associates, the Wheat Foods Council, the North American Millers' Association, the American Bakers Association and the National Wheat Improvement Committee. We also have good working relationships with other farm organizations in Washington, which is vitally important in building coalitions on issues of common concern.

NAWG draws on two primary resources for its work: farmer volunteer leaders who serve as officers, Board members and committee members, and professional staff with experience in association management, advocacy, communications and other areas. Blending these two packages of skills results in a professional representation with strong linkages to actual producers and real-world farm issues. Full bios for key policy staff and NAWG's grower-leaders are available at:

https://www.wheatworld.org/about-us/nawg-leaders/
https://www.wheatworld.org/about-us/staff/

The NAWG staff is responsible for implementing policy create by the NAWG Board and educating Members of Congress and Administration officials on the policy priorities set forth. Staff is also responsible for all managerial aspects of the organization and the National Wheat Foundation.

- **Chandler Goule** is NAWG's chief executive officer, with authority and responsibility for all aspects of operations for NAWG and the National Wheat Foundation.
- **Josh Tonsager** is NAWG's VP of Policy and Communications, overseeing the organization's policy development efforts and communications activities, and handling including policy portfolio which includes farm programs, crop insurance, and transportation.
- **Keira Franz** is NAWG's environmental policy advisor. As such, she leads NAWG's efforts on environmental policy, including in the issue areas of conservation, water and air, endangered species, greenhouse gas policy and other related subjects.
- **Molly O'Connor** is NAWG's trade, biotech & food policy advisor, working on biotech and food policy as well as the wheat industry's efforts to expand international markets.
- **Steve Joehl** is NAWG's research and technology director, focusing efforts on advancements in wheat research to increase production.
- **Caitlin Eannello** is NAWG's Communications Director. She works to facilitate communication between NAWG and the public and press. In addition, she is responsible for NAWG's website, newsletter and media relations.
- **Craig Berning** is NAWG's Government Relations Coordinator, who provides support to the policy team.
- **Jennifer Vanderhoff** is Chandler Goule's executive assistant. In addition to primarily assisting the CEO, this person provides office administration, including the management of state funding proposals and contracts.
- **Preston Millard** is NAWG's building and office manager, handling all aspects of managing the Wheat Building, owned by the National Wheat Foundation, and administrative functions for NAWG.

Budget: Details of NAWG's FY 2017-2018 budget is available upon request. The FY 2018-2019 budget will be considered and approved during the organization's annual meeting at Commodity Classic at the end of February 2018. As per the NAWG bylaws, the organization's funding commitments are determined by the board of directors, which has established a formula setting each states' dues based on a rolling five year average of wheat production in each state. As such, each states' dues commitments are proportional to their level of production. Each states' funding requirements for FY 2018-2019 have been determined as of January 2018 with the release by USDA's National Agricultural Statistics Service (NASS) of the 2017 crop production report. Total membership dues for FY 2018-2019 amount to $1,349,000, of which the Nebraska Wheat Board share would be $44,000.

Nebraska Wheat Board Funding Proposal

Project Title: Promotion of wheat and wheat-based foods through our four-pronged strategic plan

Type of Project: Domestic Marketing

New or Renewal: New, but a yearly funding request

Amount Requested: $**22,364.00**

Project Duration: July 1, 2018 - June 30, 2019 (our FY 2018-19)

Project Coordinator: Tim O'Connor, WFC President
7817 S. Forest St., Centennial, CO 80122
303-229-9198
toconnor@wheatfoods.org

Organization: Wheat Foods Council, 51-D Red Fox Lane, Ridgway, CO 81432;
Federal I.D. Number: 36-3495285

Other Participating Organizations: Wheat Foods Council's Membership

Mission:
The Wheat Foods Council (WFC) is a non-profit, industry-wide partnership dedicated to increasing the consumption of domestic wheat and wheat-based foods through nutrition information, education, and other promotional activities.

Background:
WFC was created in 1972 by five producer members when U.S. per capita flour consumption was at an all-time low of 110 pounds per person. The Council is now, a forty-one member strong, industry-wide organization, supported voluntarily by wheat producers, millers, bakers, allied industry and related organizations. Backed by our 46-year history, WFC is uniquely qualified to provide a credible voice and accurate messaging to nutrition professionals and personal trainers as well as to the media and consumers.

We have a four-pronged, five-year strategy for our communications program that began in 2016-17 and will continue in FY 2018-19. We are very happy with the progress being made using our current strategy that was developed after extensive dialogue with wheat stakeholders. Below is an overview of our four-pronged strategy.

Strategy One: Registered Dietitians
Our longstanding partnership with Registered Dietitians has paid healthy dividends, as they continue to amplify our strategic messaging through their expert voice. We will continue our ties to this group by providing them with the most current nutrition information and updates —

supporting our new messaging priorities — we can further strengthen the effectiveness of this proven partnership.

Currently, we're focusing on three key messages and we can add messages if others become relevant as we go:

- Gut health
- Gluten-free fad diets
- Nutrients of concern

Strategy Two: Enriched Wheat Products

We're aligned to take on the task of improving the image of enriched flour.

With an excess of misinformation on the internet, in the media and for-profit books maligning wheat, there couldn't be a better time to drive broad understanding that the foods made from enriched flour fit perfectly well into a healthful, balanced eating plan. As part of this communications effort, our focus is on talking to retail/supermarket dietitians, chefs, and consumers about these five key areas:

- The value of folic acid fortification
- Contribution of nutrients of concern in these foods
- Demystifying the milling process
- Variety, great value, and good taste can be found in foods made with enriched flour and they can be included in a healthful eating plan. The Dietary Guidelines for Americans 2015-2020 states "Make at least ½ your grains whole." The guidelines do not recommend elimination of enriched products.

Specialized programs will further support the content of our campaign across these key events:

We are hosting our second fun and engaging chef-focused event at the Culinary Institute of America in March 2018. Fifteen top U.S. chefs and restaurant menu decision makers are being invited to join us for formative seminars and a competitive cook-off to create the best-tasting meals using enriched wheat as its basis. Depending on the success of this second CIA event, we will evaluate as to whether or not this is an event we'd like to continue in FY 2018-19.

In June 2018, WFC will host our second "Enrich Your Life" 5K Race. The date and location are yet to be determined. We strongly feel this event will help us continue to build stronger connections and create a buzz around the many positive benefits of enriched flour, carbohydrates for energy, and the importance of including wheat foods in the athletes' diet. By focusing on great-tasting food and fun contests, we can deliver our messages in memorable ways. Again, depending on the success of this year's event we will determine if this is an event we'd like to continue in FY 2018-19.

Strategy Three: Personal Trainers

Relationships with nutrition experts will always be at our core, and we will continue to reach out to influential validators.

Through our survey completed in 2016, of the three groups surveyed (RDs, MDs, and PTs), Personal Trainers (PTs) had the least grasp of nutrition and wheat facts and were the group speaking to the most people! Armed with this information WFC decided this was a group of influencers WFC needed to reach. This is a huge group of influencers - over 3X more than Registered Dietitians (284,000 vs. 94,000) and they have strong relationships with friends, family, and clients who frequently discuss health and nutrition information. We will continue to

tap into this network to provide PTs with accurate information about wheat and wheat-based foods that they in-turn can share with their networks.

Our Personal Trainer outreach is focused on three key goals:

- Establish a presence in the Personal Trainer community, by exhibiting, sponsoring speakers at their large annual conferences, and sponsoring webinars.
- Become a source of science-based nutrition advice and information – we started a website the Center for Nutrition and Athletics as a place PTs can go to obtain science-based nutrition information for the athlete and we are currently beta testing a "Food and Fit" App developed for PTs.
- Continue to build relationships with influential members of the PT community – we've established good relationships with ACSM (American College of Sports Medicine), IDEA (International Dance and Exercise Association) and SCAN (Sports, Cardiovascular, and Wellness practice group of the Academy of Nutrition and Dietetics).

We're very happy with the positive strides we've made early on with this influencer group and plan to keep the momentum going by continuing to exhibit, offer our advisory board members as presenters, offer additional webinars, and to capitalize on other opportunities to connect with this group as they come up.

Strategy Four: Modern Wheat/Wheat Breeding

Another important conversation that's dominated by misinformation is the one about the future of modern agriculture. GMO "scares" and press coverage of "Franken-food" ballot initiatives need to be balanced with true and positive information about the future of wheat production in the U.S. Higher yields, improved drought resistance, less chemical application, and other sustainable long-term practices are just a few of the important topics the industry will bring forward to help shape a better understanding and image of "modern wheat" and how it can be beneficial to a growing world.

Our goal for the coming years is to be an industry resource on this issue and to work with our members to provide the tools and support needed to communicate the facts and engage in helpful conversations.

As a first step toward leading these conversations, we launched an education series called Conserving the Grain, Extending Its Legacy. Brett Carver, Wheat Breeder, OSU has taped the first segment of this series and it will be available on our website and to members are soon as it has been finalized. Its focus is on increasing understanding of these key topics:

- That wheat is both wholesome and natural, and contrary to misconceptions, its makeup today is principally the same as it was when wheat breeding got started in the early 20th century.
- The remarkable similarity between the wheat we eat today and the legacy grains that make up their backbone. Biochemically and genetically, today's wheat varieties are mirror images of heirloom varieties.
- How all types of wheat research, including wheat breeding, have contributed to significant gains in overall productivity and a more plentiful and reliable food source for all.

In addition to our four-pronged strategy, WFC will continue to:

- Maintain a professionally developed website devoted to being "The place to go when you want to know about all things wheat." Our resource section continues to grow and contains "toolkits" on a variety of topics geared to a variety of target audiences,

PowerPoint Presentations and “Fact Sheets” are available free of charge to download and utilize at www.wheatfoods.org

- Promote and defend wheat using science-based facts to counter the numerous myths surrounding gluten and wheat. Science is on our side. WFC promotes the nutritional benefits of wheat and provides influencers with valid reasons to recommend wheat and wheat-based foods (delicious taste, budget-friendly, can assist in weight management, aids in the prevention of certain diseases and cancers, etc.).

- Distribute our messaging materials through our popular quarterly e-magazine “Kernels,” which currently has approximately 6,400 subscribers, as well as over 500 supermarket dietitians who work directly with consumers in their retail stores and often have in-store newsletters, newspaper columns, TV shows and social media platforms. Our “News You Can Use” newsletter is written and targeted primarily to this group, but it can also be edited slightly and used for other target audiences.

- Utilize our advisory board members throughout the year to review research literature and to seek their expert advice on the content of letters we send in defense of wheat, and advocating against “fad diets” such as “gluten-free” (which is only medically necessary for those diagnosed with celiac disease) and “anti-grain” diets. Our advisory board was developed to have a pro-active as well as re-active role regarding threats to the industry such as Wheat Belly, Grain Brain, and others. We currently have four scientific advisory board members. They play a vital role in our crisis communications program and we have relied on their expertise numerous times in the past and will continue to use them as needs arise for presentations, articles, developing messaging points, etc., throughout the year.

Our Scientific Advisory Board:

- Brett Carver, Ph.D. – Wheat breeder, OSU
- Glenn Gaesser, Ph.D. – Professor, Director of Healthy Lifestyles Research Center, ASU
- Nancy Clark MS, RD – THE premiere sports nutritionist for age group and elite athletes for more than 20 years
- Travis Thomas, Ph.D., RD, CSSD - Assistant Professor, Clinical and Sports Nutrition, University of Kentucky

- Work in collaboration with the “Grain Chain” which represents producers, millers, bakers, and manufacturers. This group includes the American Bakers Association, Grain Foods Foundation, National Association of Wheat Growers, National Pasta Association, North American Millers' Association, U.S. Wheat Associates, USA Rice Federation, and the Wheat Foods Council.

- Develop science-supported materials/talking points for member use against "threats" to the wheat industry as they arise. It's vital to the industry to have a unified voice with consistent messaging to combat misinformation.

- Reach consumers through media Registered Dietitians (RDs). Currently, 12 dietitians who regularly work with national and local media with a diverse geographic/demographic representation have been charged with initiating TV and print placements based on message points and story ideas the WFC provides. This outreach provides a ready-made team to respond to media in crisis situations as well as providing for ongoing positive messaging.

- Work with our agency's consultant, who is a tri-athlete and 2-time world-medalist, Michele Tuttle, MPH, RD, to promote the importance of complex carbohydrates, such as wheat, to athletes for performance and endurance.

Total Dollar Amount Requested:

Our FY 2018-19 program budget, which is currently in development, will be presented and voted on during our summer meeting June 14, 2018, in Portland, OR. We expect the programming budget for FY 2018-19 to be similar to our current fiscal year's budget of $640,000.
The chart included below shows how we calculated our funding request of $**22,364,** which is 3.5 % of our anticipated program budget.

State	2013	2014	2015	2016	2017	Total	Olympic average	Multiplied by $.41/1000 bu.
Nebraska	~~39,900~~ (low dropped)	~~71,050~~ (high dropped)	45,980	70,740	46,920	163,640 (Remaining 3 years added together)	54,547 (Total divided by 3)	**$22,364**

Payment Schedule:
Payments can be made on an annual, bi-annual, quarterly, or monthly basis. Specific arrangements can be made by contacting Gayle Veum, WFC at 1-800-970-2254, 970-275-4440 or gveum@wheatfoods.org. In the past, NWB has paid their membership dues quarterly.

We appreciate the support and commitment NWB has given the WFC in the past, and we thank you for your consideration of our funding proposal for FY 2018-19.

Grant Proposal Submitted To

NEBRASKA WHEAT BOARD

Lincoln, Nebraska

Submitted by:

NEBRASKA LEAD PROGRAM

Nebraska Agricultural Leadership Council

Dr. Terry Hejny, President

Amount Requested: $5,000

Projection Duration: July 1, 2018 – June 30, 2019

January 26, 2018

PROGRAM TITLE:

Nebraska LEAD Program
(Leadership Education/Action Development)

ORGANIZATION NAME:

Nebraska Agricultural Leadership Council

PROGRAM DIRECTOR:
Dr. Terry Hejny, Director
Nebraska Agricultural Leadership Council
104 ACB
University of Nebraska
Lincoln, NE 68583-0763
Phone: 402/472-6810 FAX: 402/472-6799
thejny1@unl.edu

ORGANIZATION STATUS
Educational Non-Profit Corporation
IRS Section 501(c) (3) Status
(Document available upon request)
Tax Exempt #47-0379839
or #47-0769903

BACKGROUND, PURPOSE, GOALS AND MISSION

Thirty-seven years ago, the Nebraska LEAD (Leadership Education/Action Development) was established with funding from a host of donors, from all levels, including the W. K. Kellogg Foundation. The Nebraska LEAD Program is under the direction of the Board of Directors of the Nebraska Agricultural Leadership Council and is a statewide agricultural leadership development program. The purpose of the Nebraska LEAD Program is to provide Nebraska's most promising adult men and women agriculturalists an opportunity to participate in an intensive two-year educational program designed to enhance leadership development, essential for both the short-term and long-term future of farming/ranching, agribusiness, Nebraska and the nation. ***Specifically, the program is designed to both prepare and develop those problem solvers, decision makers and spokespersons so much needed by both agriculture and our state. The mission of the Nebraska LEAD Program is "to prepare and motivate men and women in agriculture for more effective leadership."***

NEED FOR THE PROGRAM

In less than one-hundred years, our nation has transformed from frontier agriculture into the most productive and efficient system in the world. Today, we live in a society that has never experienced the extreme ravages of hunger and is now predominately two to three generations removed from the land. As a result, an abundant and varied food supply is assumed and few worry about agriculture as long as our nation's supermarkets are well stocked with quality, healthful, reasonably priced food.

The unprecedented success of agriculture has brought on a whole new array of challenges, issues and concerns. As the focus of our society has shifted from agriculture to more contemporary issues of our time, terrorism, crime, legislation, health care, job security and environmental quality, to name a few, capture our attention. Expanding technology, shifting demographic patterns, changing family structures and fluctuating employment are bringing about significant changes to our society. With less than two percent of our nation's population engaged in farming, and twenty-five percent employed in agriculturally-related business, low-populated, leading states like Nebraska face change and extraordinary challenges.

In more urban areas and at the national level, agriculture is often viewed by the public as competition for natural resources while failing to understand that these same natural resources are the source of their own sustenance. Urban and rural sectors continue to increase the debate over appropriate use of land. Environmental compatibility,

construction, vistas, water, road traffic, odor, air quality, and noise are at issue between both groups. Agriculture's political clout has been shifting to the urban and suburban sectors of our society.

In recent memory for most, our nation's farm and land policy was formulated by agricultural organizations and interests. Yet today, farm and land policy draws attention and input from environmentalists, wetland ecologists, and wildlife preservationists, supporters of animal rights, advocates of food safety and food stamps, those opposed to biotechnology, those with interest in rural revitalization, and others. Provisions in legislation such as the Clean Water Act, Endangered Species Act, Waters of the U.S. and others have already provided new challenges with respect to the nature of doing business.

In order to effectively deal with these challenges, agricultural leaders must possess an understanding of opposing viewpoints of people from diverse segments of our society and sensitivity to a broad array of issues. To be effective, our food and agricultural community must acknowledge emerging trends and understand the driving forces behind them. Agriculture and our rural-urban society must be able to see the "bigger picture" and must learn how to more effectively work together. An unprecedented need exists to increase communication and understanding between urban and rural interests. Agriculture critically needs leaders capable of addressing both national and global perspectives, and be tuned to economic opportunities for our mutual success and quality of life. We need leaders who can communicate and effectively solve complex problems for a positive influence on our future. Leaders from both urban and rural interest must be working together for the well-being of everyone.

PROGRAM DESCRIPTION

The Nebraska LEAD Program is Nebraska's premier, state-wide, agricultural leadership education program and has received considerable national attention and often serves as a role model for other states. Participants are selected annually for a two-year "fellowship". Over the two-year period, Nebraska LEAD "Fellows" participate in twelve three-day in-state seminars, which include spouses on four occasions. Seminars are conducted at eleven cooperating public and private colleges and universities across Nebraska. Recognized leaders and presenters represent a wide-range of disciplines from various colleges and universities, the governmental and the private sectors, which include corporate executives, entrepreneurs, organizational interests and prominent community leaders. Educational content addresses interpersonal skill development, communications, sociology, history, education, public policy issues, macroeconomics, labor, business, industry, community development, natural resources, cultural understanding, leadership as well as agriculture and a host of other topical areas.

During the first year of the program, participants study local, state and national issues which culminate with a ten-day national study/travel seminar to three major U.S. cities. Meetings with representatives from government, business and industry, labor and both state and national organizations complement the in-state seminar study and provide participants with practical first-hand exposure to the varied social, political, economic and other conditions that exist in this country.

The second year of the program continues to build on the first year topics with added global perspectives. Emphasis is placed on international trade, foreign policy, cross-cultural understanding, and geopolitics. The capstone of the second year's study is a fourteen-day international study/travel seminar to selected countries of the world. A mix of highly developed and highly undeveloped countries serves as the basis for this experience. Considering that many of the world's most critical problems tie directly with agriculture, population expansion, world religions, increasing food deficiencies, global trade dependencies, energy concerns, the international seminar provides immeasurable learning opportunities for heightened global understanding for more effective agricultural leadership and perspective.

PROGRAM PARTICIPANTS:

By design, program participants come from every sector of agriculture and every part of Nebraska. Annually up to thirty "fellows" are selected for participation in each class with preference given to applicants between the general ages of 25-50.

Applicants provide extensive information about themselves, their business and organizational affiliations. They must establish a sound reason for involvement in the Nebraska LEAD Program and how they will use the knowledge, skills and abilities received through the program to benefit their community, business and/or organizations.

Following the review of applications, five member regional lay selection committees representing agriculture, business, academia and Nebraska LEAD Alumni personally interview each candidate along with their spouse, if married, in each of five geographic districts throughout Nebraska. The recommendations of the regional selection committees are then presented to the Nebraska Agricultural Leadership Council Board of Directors for final approval and acceptance into the program.

PROGRAM EVALUATION AND RESULTS:

Program evaluation is ongoing and continuous. Participant evaluations of all seminar activities are reviewed by the Program Director and the Academic Committee of the Council. The Academic Committee actively monitors the program's state goals and objectives for program change, refinement and overall effectiveness.

The Nebraska LEAD Program is also open to public scrutiny daily because of its highly visible nature. The program's board members, committees, council members, alumni and supporters share in the responsibility to ensure high program quality and work for the program's continued improvement.

FORMAL PROGRAM FOLLOW-UP STUDIES:

Comprehensive follow-up studies have been conducted by external evaluators, on a regular five year basis throughout the history of the Nebraska LEAD Program. Each of the studies has targeted one or more of the following groups: program participants, program alumni, individuals who had applied for the program but who were not accepted and individuals who had not applied for the program. The most recent five year follow-study (2011) is entitled "A Thirty Year Follow-up Study of the Nebraska LEAD Program and is available for review upon request. Additionally, the NALC is in the process of conducting a follow-up study that includes LEAD Groups 26-35. Results from this study will be available later this spring.

ACCOMPLISHMENTS OF THIS PROGRAM:

Past participants of the Nebraska LEAD Program serve in a large number of policy and decision-making roles. They represent a cross section of Nebraska; serving at the local, state, national and international level. A long list of organizations and groups including boards of education, commodity boards, county commissions and agricultural associations and organizations have benefited through effective agricultural leadership development. One simply needs to look at membership of any statewide agricultural organization to see program alumni. Program alumni often note self-confidence, improved communication skills, expanded horizons, attitudinal changes, the ability and willingness to examine all sides of issues, better understanding of others and a commitment to be a part of a solution. Coupled with unique educational experiences and precious exposure, they possess rekindled energy and confidence to be involved with more open participatory leadership style and skill.

BOARD MEMBERS, PAID STAFF AND VOLUNTEERS

The Board of Directors of the Nebraska Agricultural Leadership Council, an educational, non-profit corporation, provides overall direction for the Nebraska LEAD (Leadership Education/Action Development) Program. The Council is composed of recognized leaders in education, business, industry, production agriculture and agribusiness throughout Nebraska.

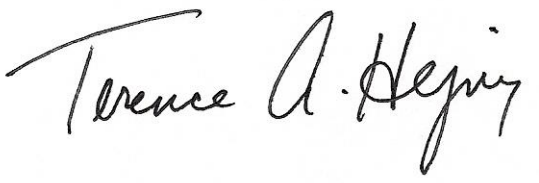
The Council's Board of Directors serves voluntarily receiving no compensation for expenses. All Board members either represent corporate donors or are individual donors to the program. Board members serve for a three-year period, with a maximum of two consecutive terms, with various committee responsibilities.

The Board works in conjunction with a full-time Executive Director and Administrative Associate along with a one-half time secretary during the academic/school year. The office staff is essentially responsible for resource development, program development and delivery and public relations. The Executive Director's salary and office space are provided on an in-kind basis by the University of Nebraska-Lincoln through the Institute of Agriculture and Natural Resources. All other program operating expenditures are provided through private contributions and support.

FUNDING REQUEST

The Nebraska Agricultural Leadership Council requests financial support from the Nebraska Wheat Board in the amount of $5,000 for the 2018-2019 program year. This contribution, along with support from other private individuals, businesses and foundations will enable the Council to meet its commitment to, and insure the continued success of, the Nebraska LEAD Program.

Respectfully submitted on behalf of the Council on January 26, 2018, to the Nebraska Wheat Board:



By

Dr. Terry Hejny, President

January 26, 2018

Mr. Royce Schaneman
Executive Director
Nebraska Wheat Board
301 Centennial Mall South
Lincoln, NE 68509

Dear Royce:

We most certainly appreciate the past support of the Nebraska Wheat Board and for the opportunity to once again apply for financial assistance for the upcoming fiscal year.

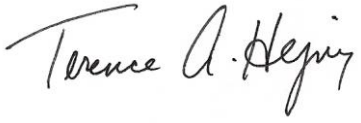
Royce, we consider our organizations as partners in improving the agricultural outlook in Nebraska. Through this partnership, the Nebraska LEAD Program assists you in meeting your mission to create and enhance profitable opportunities for Nebraska's wheat growers. We do this by training Nebraska's agriculturalist to promote Nebraska's wheat industry in their local areas and throughout the state. Their words also reach extended boundaries when our Fellows participate in both national and international travel study seminars.

It is again time to ask you to make an investment in the amount of **$5,000**. The Nebraska Wheat Board's support will provide valuable assistance in underwriting program delivery costs for the **2018-2019** programming year. This investment, along with that of others, will insure the high quality program that we have come to know through the years. I am the first to say that our past success is due to the generosity of many individuals, corporations, organizations and foundations, including the Nebraska Wheat Board.

As a leader yourself, you are aware of the large number of Nebraska LEAD alumni who serve in policy and decision-making positions of leadership at all levels. Your continued investment in Nebraska's future will permit the Nebraska LEAD Program to continue its purpose in developing the problem-solvers, decision-makers and spokespersons needed by agriculture and our state.

If you would like, I am pleased to meet with you or others in your organization that are responsible for funding decisions. If you would like to meet with me, I can be reached at 402-472-6810. With grateful appreciation for your consideration of this request for support, I remain

Sincerely,



Dr. Terry Hejny, Director

NebraskaLife MAGAZINE

Insertion Order
Nebraska Life Magazine
PO Box 819 • Norfolk, NE 68702-0819
800-777-6159 • fax: 402-371-5448
Order Number: 4399
2/6/2018

Advertiser:
Caroline Brauer
Nebraska Wheat Board
301 Centennial Mall S
PO Box 94912
Lincoln, NE 68509

Phone: (402) 471-2358
Fax: (402) 471-3446
Email: wheat.board@nebraska.gov

Billing:
Caroline Brauer
Nebraska Wheat Board
301 Centennial Mall S
PO Box 94912
Lincoln, NE 68509
Phone: (402) 471-2358
Fax: (402) 471-3446
Email: wheat.board@nebraska.gov

Sales Rep Contact Information:

Rep: Beth Foland

Email: bfoland@flagshippublishing.com
Please sign and date below and email or fax directly to your sales representative.
We appreciate your business!

Pub	Issue	Year	Ad Size	Color	Frequency	Card Rate	Net	Amount
Nebraska Life Magazine	May_June	2018	1/3 H	4-Color	3x	630.00	$630.00	$630.00
Nebraska Life Magazine	Sept_Oct	2018	1/3 H	4-Color	3x	630.00	$630.00	$630.00
Nebraska Life Magazine	Jan_Feb	2019	1/3 H	4-Color	3x	630.00	$630.00	$630.00
Total								**$1,890.00**

Total:	**$1,890.00**

To reserve your space please print, sign, scan and return to your sales representative by email, fax or mail.
All advertisements come with complimentary ad design.
If prepaying for contract, please make checks payable to Flagship Publishing.
Proofing: If ad is proofed two times with no response Nebraska Life reserves the right to run the ad as developed.

If you do wish to send a camera ready advertisement, please use the following requirements.

File Formats: PDF files are preferred for all ad submissions. A high-resolution (300 dpi), press-quality PDF is acceptable. PDFs must adhere to the following specifications:
- All high-resolution images and fonts must be embedded in the PDF file.
- All images should have an effective resolution of 300 dpi and be saved in the CMYK color space as an .EPS or .TIF file.

Terms: Ad placements are invoiced 15 days prior to each issue date. Net due 30 days. A 5% discount can be taken off the total price if the contract is paid in full prior to first issue billing. Frequency rate must be earned within one year from first insertion. Advertisers will be short rated and re-billed at the earned frequency rate immediately following cancellation or curtailment of space frequency contracted. Publisher does not accept cancellations after the publication closing date.

Authorization for Advertising: I am hereby authorized to publish the advertisement detailed above.
I hereby affirm that I am authorized to contract for this advertising on behalf of the above named advertiser. I acknowledge this insertion order is subject to all terms and conditions of the publishers currently applicable rate card which is hereby incorporated by reference herein. Payment terms: Net 30 days for each advertisement.
Thank you for advertising with *Nebraska Life Magazine*!

Authorized Signature:_____ Title:_____

Date:_____

Nebraska*Life* MAGAZINE

Insertion Order
Nebraska Life Magazine
PO Box 819 • Norfolk, NE 68702-0819
800-777-6159 • fax: 402-371-5448
Order Number: 4398
2/6/2018

Advertiser:
Caroline Brauer
Nebraska Wheat Board
301 Centennial Mall S
PO Box 94912
Lincoln, NE 68509

Phone: (402) 471-2358
Fax: (402) 471-3446
Email: wheat.board@nebraska.gov

Billing:
Caroline Brauer
Nebraska Wheat Board
301 Centennial Mall S
PO Box 94912
Lincoln, NE 68509
Phone: (402) 471-2358
Fax: (402) 471-3446
Email: wheat.board@nebraska.gov

Sales Rep Contact Information:

Rep: Beth Foland

Email: bfoland@flagshippublishing.com
Please sign and date below and email or fax directly to your sales representative.
We appreciate your business!

Pub	Issue	Year	Ad Size	Color	Frequency	Card Rate	Net	Amount
Nebraska Life Magazine	May_June	2018	1/2 H	4-Color	3x	900.00	$900.00	$900.00
Nebraska Life Magazine	Sept_Oct	2018	1/2 H	4-Color	3x	900.00	$900.00	$900.00
Nebraska Life Magazine	Jan_Feb	2019	1/2 H	4-Color	3x	900.00	$900.00	$900.00
Total								**$2,700.00**

Total:	**$2,700.00**

To reserve your space please print, sign, scan and return to your sales representative by email, fax or mail.
All advertisements come with complimentary ad design.
If prepaying for contract, please make checks payable to Flagship Publishing.
Proofing: If ad is proofed two times with no response Nebraska Life reserves the right to run the ad as developed.

If you do wish to send a camera ready advertisement, please use the following requirements.

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- All high-resolution images and fonts must be embedded in the PDF file.
- All images should have an effective resolution of 300 dpi and be saved in the CMYK color space as an .EPS or .TIF file.

Terms: Ad placements are invoiced 15 days prior to each issue date. Net due 30 days. A 5% discount can be taken off the total price if the contract is paid in full prior to first issue billing. Frequency rate must be earned within one year from first insertion. Advertisers will be short rated and re-billed at the earned frequency rate immediately following cancellation or curtailment of space frequency contracted. Publisher does not accept cancellations after the publication closing date.

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Thank you for advertising with *Nebraska Life Magazine*!

Authorized Signature:_____ Title:_____

Date:_____

Nebraska Life MAGAZINE

Insertion Order
Nebraska Life Magazine
PO Box 819 • Norfolk, NE 68702-0819
800-777-6159 • fax: 402-371-5448
Order Number: 4397
2/6/2018

Advertiser:
Caroline Brauer
Nebraska Wheat Board
301 Centennial Mall S
PO Box 94912
Lincoln, NE 68509

Phone: (402) 471-2358
Fax: (402) 471-3446
Email: wheat.board@nebraska.gov

Billing:
Caroline Brauer
Nebraska Wheat Board
301 Centennial Mall S
PO Box 94912
Lincoln, NE 68509
Phone: (402) 471-2358
Fax: (402) 471-3446
Email: wheat.board@nebraska.gov

Sales Rep Contact Information:

Rep: Beth Foland

Email: bfoland@flagshippublishing.com
Please sign and date below and email or fax directly to your sales representative.
We appreciate your business!

Pub	Issue	Year	Ad Size	Color	Frequency	Card Rate	Net	Amount
Nebraska Life Magazine	May_June	2018	2/3 V	4-Color	3x	1,170.00	$1,170.00	$1,170.00
Nebraska Life Magazine	Sept_Oct	2018	2/3 V	4-Color	3x	1,170.00	$1,170.00	$1,170.00
Nebraska Life Magazine	Jan_Feb	2019	2/3 V	4-Color	3x	1,170.00	$1,170.00	$1,170.00
Total								**$3,510.00**

Total:	**$3,510.00**

To reserve your space please print, sign, scan and return to your sales representative by email, fax or mail.
All advertisements come with complimentary ad design.
If prepaying for contract, please make checks payable to Flagship Publishing.
Proofing: If ad is proofed two times with no response Nebraska Life reserves the right to run the ad as developed.

If you do wish to send a camera ready advertisement, please use the following requirements.

File Formats: PDF files are preferred for all ad submissions. A high-resolution (300 dpi), press-quality PDF is acceptable. PDFs must adhere to the following specifications:
- All high-resolution images and fonts must be embedded in the PDF file.
- All images should have an effective resolution of 300 dpi and be saved in the CMYK color space as an .EPS or .TIF file.

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Thank you for advertising with *Nebraska Life Magazine*!

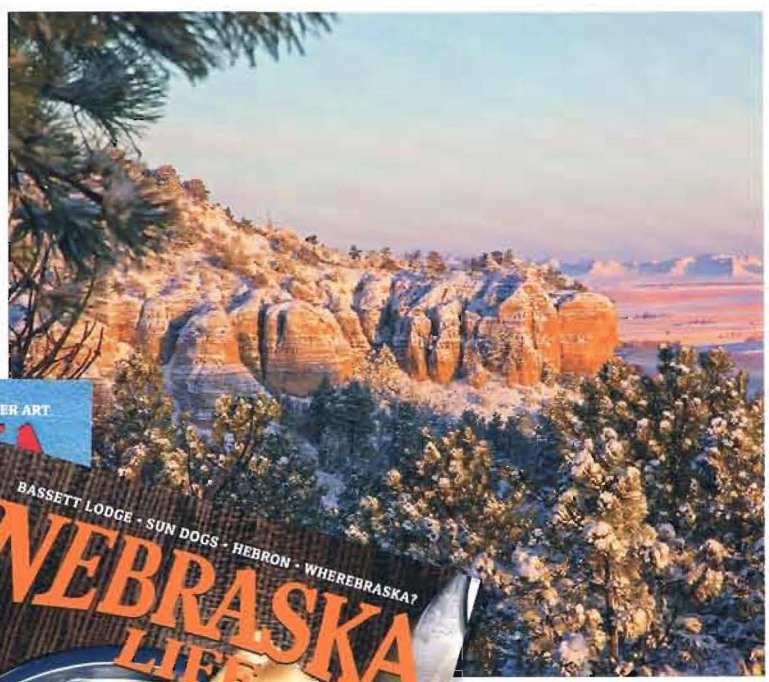
Authorized Signature:_____ Title:_____

Date:_____

NEBRASKA LIFE MAGAZINE

HISTORY ADVENTURE RECIPES TRAVEL

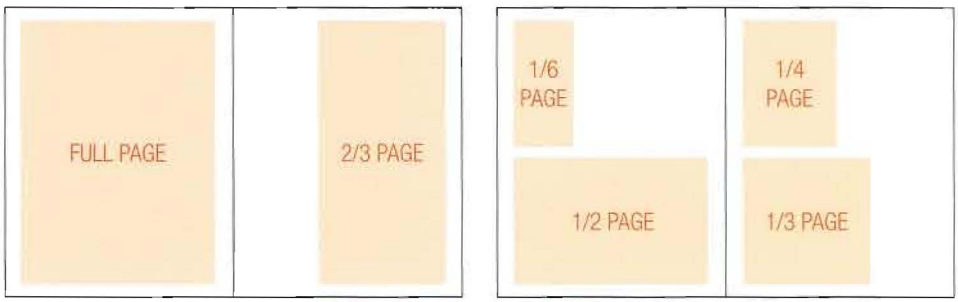
Advertising MEDIA KIT



Custom Advertising Plan

Let us custom tailor the ideal package for your business. Contact your *Nebraska Life Magazine* advertising rep to create an advertising package specifically for your company's calendar, budget and sales goals.

AD RATES



Rates are billed on a per issue basis.	FULL	2/3	1/2	1/3	1/4	1/6
1 ISSUE	$1,800	$1,300	$1,000	$700	$500	$350
3 ISSUES	$1,620	$1,170	$900	$630	$450	$315
6 ISSUES	$1,440	$1,040	$800	$560	$400	$280

Premier Placements including back cover are available.
Contact your Advertising Representative for more information.

ADVERTISING DEADLINES
Space Reservation

Issue	Closing Date
January/February	November 1
March/April	December 15
May/June	March 1
July/August	May 1
September/October	July 1
November/December	September 1

Materials, photos, logos, content and camera ready ads are due 5 days following the closing date. Please use the next working day for dates that fall on a holiday or weekend.

IMPORTANT
Advertising Information

1. **Prepayment Discounts:** Yearly contracts paid in full at contract signing earn a 5% discount.
2. **Proofing:** If ad is proofed 2 times with no response, *Nebraska Life* reserves the right to run the ad as developed.
3. **Ownership:** *Nebraska Life* retains all ownership of ads produced by *Nebraska Life*, and ads may not be used elsewhere without permission.
4. **Complimentary Design:** Ad design is available FREE of charge with advertising contract.
5. **Space Reservation:** For an enjoyable reading experience, page count for each magazine is set and advertising is capped at 30%. Some issues fill up fast, and ad space is sold on a first-come, first-served basis.

NEBRASKA LIFE MAGAZINE

Flagship Publishing, Inc.
PO Box 819 • Norfolk, NE 68702-0819
Phone: 800-777-6159 • Fax: 402-371-5448
NebraskaLife.com • advertising@flagshippublishing.com

Who are our SUBSCRIBERS?

DISTRIBUTION

36,000 paid subscriptions
\+ **2,000** office copies
\+ **6,000** copies on newsstands

44,000 TOTAL DISTRIBUTION

LOCATION

7,920 readers live out-of-state

GENDER AND AGE *

79% of readers are between the ages of **46-85**

41% male
59% female

HOME OWNERSHIP *

92% of readers are homeowners

43% of readers have lived in their residence for **14+ years**

ENTERTAINMENT *

In their free-time, our subscibers are likely to enjoy:

- Collectible arts
- Equestrian riding
- Time with grandchildren
- Sewing, knitting and needlework
- Domestic travel

* Source: December 2014 subscriber study by Wiland.

THE NEBRASKA WHEAT GROWERS ASSOCIATION

P.O. Box 95063
Lincoln, NE 68509

Telephone (402) 471-2358
FAX (402) 471-3446

To the Nebraska Wheat Board

The Nebraska Wheat Growers Association is requesting funding support for the Wheat Issues Monitoring project in fiscal year 2018-2019. We appreciate your consideration of this request.

Project Title: NWGA Wheat Issues Monitoring

Project Type: Federal Policy Development

Funds Requested: $27,500

Project Duration: July 1, 2018-June 30, 2019

Project Coordinator: Caroline Brauer, PO Box 95063, Lincoln, NE 68509; newheatgrowers@gmail.com; (402) 471-2358

Organization:
Nebraska Wheat Growers Association
PO Box 95063
Lincoln, NE 68509
P: 402-471-2358
F: 402-471-3446
newheatgrowers@gmail.com

Abstract: With an upcoming farm bill and trade limitations part of conversations in Washington DC, the Wheat Issues Monitoring project will ensure the interests and positions of Nebraska wheat farmers are represented before Congress.

Outcomes: The project will provide representation for Nebraska wheat farmers in national wheat meetings where industry policy stances are decided. Wheat farmers will be provided a forum in the format of local NWGA meetings to discuss policy and regulatory concerns. Accurate information on wheat production practices and the impact of policy decisions will be provided to Nebraska's congressional leaders.

Method: NWGA board members will participate in annual meetings of the National Association of Wheat Growers, of which NWGA is a voting member, to ensure Nebraska is represented in national wheat policy conversations. NWGA will hold local meetings within the state to discuss federal trade and policy issues, and allow state wheat producers to voice concerns or provide input. NWGA will participate in at least one trip to DC as part of a larger NAWG/USW meeting, along with other fly-in or potential return trip opportunities for NWGA leadership or farmer members to educate the state's

THE NEBRASKA
WHEAT GROWERS
ASSOCIATION

P.O. Box 95063
Lincoln, NE 68509

Telephone (402) 471-2358
FAX (402) 471-3446

congressional leaders on policy and trade issues affecting Nebraska wheat farmers. NWGA will also consider hosting an ethics committee complaint reception in Washington, DC to educate Nebraska congressional staffers on wheat issues. Potential events or meetings NWGA will participate in during FY 17-18 include but are not limited to:

NAWG/USW joint fall convention, Tampa, FL
NWGA annual meeting, North Platte, NE
NAWG/USW joint winter convention, Washington, DC
Nebraska Wheat reception for congressional leaders
Commodity Classic, Orlando, FL
Governor's Ag Conference, Kearney, NE
NWIC research fly-in, Washington, DC
NAWG Farm-Bill fly-in, Washington, DC

Relevance: Congress is currently discussing a new Farm Bill, along with issues like MAP/FMD funding, support for USDA-ARS research, trade agreements like NAFTA, the potential for rejoining TPP, and EPA/OSHA regulations. All of these have the ability to impact wheat farmers in Nebraska. With less than 2 percent of the population actively engaged in agriculture, and the average person at least two generations removed from the farm, it's safe to say most congressional delegates do not understand agriculture. If farmers don't take steps to ensure their voices are heard and accurate information is provided, Congress will set agriculture policy based on information from other organizations and groups who may not have the best interests of our state's wheat farmers in mind.

Impact: Every wheat farmer in the state who desires new varieties of wheat to be researched, who pays to have crop insurance as protection against crop failures from means beyond their control, who is subject to the rules and regulations of organizations like the EPA will benefit from this project because their interests will be represented by like-minded farmers who have listened to their input and then presented it to leaders in Washington DC.

Method Suitability: This method ensures that the interests of Nebraska farmers are represented by farmers who have heard and also have first-hand experience in the impacts of federal policy and regulations on their operations. It allows the interests of Nebraska farmers to be carried to DC by those who are more than just a lobby organization hired to express a viewpoint; these delegates are farmer constituents, giving them more clout with congressional leaders. This approach also allows for a unified message to come from Nebraska's wheat industry.

Budget: The funds will be used to support the transportation and participation of NWGA board members to NAWG meetings and national fly-ins. On average, it costs $2,000 per person to send a member to a NAWG meeting. These funds cover mileage, airfare, a per diem for meals provided at the federal rate and lodging. The allocated funds would also cover the mileage, per diems or lodging

THE NEBRASKA
WHEAT GROWERS
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P.O. Box 95063
Lincoln, NE 68509

Telephone (402) 471-2358
FAX (402) 471-3446

needed for NWGA members to participate in local meetings covering federal policy issues. Also included in the budget is the cost of hosting an annual convention for NWGA where state farmers can voice their opinions on issues and set resolutions on how to address policy topics and the costs of hosting and participating in a Washington, DC reception.

THE NEBRASKA
WHEAT GROWERS
ASSOCIATION

P.O. Box 95063
Lincoln, NE 68509

Telephone (402) 471-2358
FAX (402) 471-3446

To the Nebraska Wheat Board

The Nebraska Wheat Growers Association is requesting funding support for the Wheat Education Opportunities project in fiscal year 2018-2019. We appreciate your consideration of this request.

Project Title: NWGA Wheat Education Opportunities

Project Type: Education

Funds Requested: $2,500

Project Duration: July 1, 2018-June 30, 2019

Project Coordinator: Caroline Brauer, PO Box 95063, Lincoln, NE 68509; newheatgrowers@gmail.com; (402) 471-2358

Organization: Nebraska Wheat Growers Association
PO Box 95063
Lincoln, NE 68509
P: 402-471-2358
F: 402-471-3446
newheatgrowers@gmail.com

Abstract: The Wheat Education Opportunities project will provide activities and materials to both consumers to educate them on the role of wheat and agriculture in food as well as educating farmers on production practices to better the wheat on their operations. These projects are education opportunities that would happen outside of educational events where the Mobile Baking Lab would be present.

Project Outcomes: This project would increase the access of accurate information to schools and consumers on the benefits of wheat and grains in the diet. The project would also increase the presence of wheat foods highlighting that they are such on recipe and social media platforms. The project would also increase farmer awareness of and access to information on best farming practices for wheat.

Method: NWGA will participate in cooking school events across the state to share information with home bakers on the benefits of wheat and grains in the diet. In addition, the organization will continue to maintain the "Fun with Wheat" blog that features fun and easy wheat food recipes, wheat nutrition info and facts about flour. Each post will also be tied into social media outlets like Facebook, Twitter and Pinterest to increase attention and presence before consumers actively engaged in baking and

THE NEBRASKA
WHEAT GROWERS
ASSOCIATION

P.O. Box 95063
Lincoln, NE 68509

Telephone (402) 471-2358
FAX (402) 471-3446

cooking. Another campaign like the "12 Days of Christmas Wheat Treats" would be considered as well.

To educate producers, NWGA will participate in trade shows and field days to share information on best farming practices. Events may include but aren't limited to: Certified Seed Dealer Days, Husker Harvest Days, hosted education seminars and networking events, and UNL wheat plot tours. In addition, NWGA may support the sharing of printed information on farming practices in e-mail blasts, direct mail pieces or the NWGA newsletter *Newswheat* with farmer members.

Relevance: There is a growing divide between the consumers and the farm. There is also a misperception of wheat and gluten as being bad. Efforts by this project will target individuals making food decisions for their households. There are also decreasing wheat acres in the state, cost of production is high, and challenges facing farmers are ever growing. This project will provide information to farmers allowing them to make production decisions to produce the best quality and quantity of wheat possible.

Impact: The overall beneficiary of this project would be the wheat farmer. In addition to getting farming information that could be applied to their operations, they will get positive messaging about their product presented to consumers.

Method Suitability: Online recipe databases are the new norm, especially for younger generations. Bloggers, Pinterest and sites like All-recipes tout everything from homemade breads to 7-course meals. Facebook recipes for NWGA and NWB in the last fiscal year accounted for more than 30,000 people reached, over 3,500 post engagements (likes, comments or link clicks) and 54 hours of video viewing. This project will ensure accurate information about gluten as well as foods containing wheat are shared on social media platforms to balance all the gluten-free recipes shared and promoted. It will also provide accurate information on various production issues, compiled into one resource for farmers.

Budget: Funds for this project would cover reimbursement of travel expenses for board members and volunteers running booths at educational events or trade shows. Up to $250 would be used to cover NWGA's booth rental at Chase County Fair to reserve the same location from previous years. Other funds would be used to cover supplies and ingredients used in the development of recipes shared on the "Fun With Wheat" blog and the cost of development (printing and mailing) of production information to farmers. Some funds could be used to help "boost" posts on social media outlets (to date, all traffic has been non-paid or "organic" interaction.)

THE NEBRASKA
WHEAT GROWERS
ASSOCIATION

P.O. Box 95063
Lincoln, NE 68509

Telephone (402) 471-2358
FAX (402) 471-3446

To the Nebraska Wheat Board

The Nebraska Wheat Growers Association is requesting funding support for the Mobile Baking Lab project in fiscal year 2018-2019. We appreciate your consideration of this request.

Project Title: NWGA Mobile Baking Lab

Project Type: Education and Domestic Marketing, Renewal

Funds Requested: $8,000

Project Duration: July 1, 2018-June 30, 2019

Project Coordinator: Caroline Brauer, PO Box 95063, Lincoln, NE 68509; newheatgrowers@gmail.com; (402) 471-2358

Organization: Nebraska Wheat Growers Association
PO Box 95063
Lincoln, NE 68509
P: 402-471-2358
F: 402-471-3446
newheatgrowers@gmail.com

Additional Participating Institutions: At this time Ardent Mills has indicated they intend to continue supporting the lab through in kind donations of flour and ingredients. It is likely Plains Grains Inc. will borrow the lab or participate in joint events where the lab is present. In addition, several state institutions have requested use of the lab for events in their respective states. FCSA has also made a sponsorship to continue support of the lab's educational outreach activities.

Abstract: The mobile baking lab is a 24-foot trailer with a full-service kitchen used to bake wheat foods including: cinnamon rolls, cookies, bread and pasta. It is run by mostly volunteers in an effort to connect the farmer to consumers and share the message of agriculture through fresh-baked wheat foods.

Outcomes: The baking lab will increase consumer awareness of what foods contain wheat, how wheat is grown in Nebraska and the nutritional benefits of grain in the diet.

Methods: The baking lab will participate in several key trade show events in the state of Nebraska, and be available to participate in other regional events as requested by other wheat-friendly

THE NEBRASKA
WHEAT GROWERS
ASSOCIATION

P.O. Box 95063
Lincoln, NE 68509

Telephone (402) 471-2358
FAX (402) 471-3446

organizations. The events will be targeted to reach maximum consumers for the cost of input, with a focus on reaching youth and school aged children as they're a growing audience with less access to ag education and are more likely to be influenced in opinion than older consumers.

NWGA is also looking into partnering with area ag organizations or youth ag programs like FFA to provide a symbiotic ag outreach effort: youth could gain experience "agvocating" and network with wheat farmers and leaders, and NWGA would gain assistance at trade show events. NWGA would solicit volunteer support from ag organizations as an in-kind sponsorship; a small monetary donation would be made to ag youth organizations (e.g. local FFA chapters) for their support at events.

Some events NWGA would consider participating in with the baking lab include but aren't limited to:

Chase County Fair: Located in the heart of wheat country, the baking lab would provide cookies to fairgoers as a way to open conversations on wheat nutrition and wheat production. Information would be split between marketing to consumers and marketing to producers. Additional resources like a hand mill and thresher would help youth engage more in the story of wheat from field to food.

Water Field Day at NPREC: The baking lab would be part of the extension day focusing on water issues in North Platte. The lab has participated each of the past 2 years.

Husker Food Connection: These funds would help provide ingredients and supplies for the Wheat Ambassadors to use the baking lab during this event on the UNL city campus.

Nebraskaland Days: The lab is at the forefront during the parade, raising attention to both NWGA and farming. Signage and handouts will offer parade participants the ability to learn more about wheat and wheat foods.

Relevance: There is an average two to three generation gap between consumers and the farm. People want to know where their food is coming from, but the market is flooded with inaccurate information from bloggers and activist organizations with ulterior agendas. The baking lab will provide accurate and engaging information for consumers on where their food comes from and why they should eat wheat. This will help NWB with both its education and domestic marketing goals.

Impact: Wheat farmers will benefit from having their industry portrayed in an accurate and positive light. The wheat industry as a whole will benefit from increasing consumer awareness of wheat foods, and ideally, increasing consumption on a domestic level.

Market Suitability: The baking lab provides actual interaction with farmers at events rather than stories or printed data. The providing of wheat foods also helps open doors for more conversations and attracts people who otherwise may not express an interest in learning more about agriculture.

THE NEBRASKA
WHEAT GROWERS
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Budget: The $8,000 would be used to cover expenses of volunteers working in the baking lab outside those mentioned in volunteer sponsorship areas listed above. NWGA provides a mileage reimbursement, lodging during overnight/multiday events, and a meal per diem at the federal rate for all volunteers. This would be the primary expense. Donations to local ag groups like FFA chapters for assisting at events would fall under this expense category. The second largest expense would be the insurance and maintenance of the lab, which can run in excess of $2,000 annually, depending on needed repairs. The remainder of the allotted monies would be used to purchase ingredients not sponsored by Ardent Mills, fuel to travel to events, and the retaining of a cleaning company to come in and professionally clean the baking lab between uses to maintain sanitation.

FY2019

U.S. Wheat Associates, Inc.

International Marketing for the U.S. Wheat Producer – Renewal

Amount Requested: $175,300

July 1, 2018 – June 30, 2019

U.S. Wheat Associates, Inc.

3103 10th St., North
Suite 300
Arlington, VA 22201
202-463-0999
Fed. ID # 48-0643776
www.uswheat.org

Primary Contacts:

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U.S. Wheat Associates (USW) proposes that the Nebraska Wheat Board:

Participate in USW's FY2019 market development programs to increase U.S. wheat market share around the world.

Funding Request:

Market Development Program (Nebraska's share)	**$175,300**

Organization

U.S. Wheat Associates is the export market development organization representing the U.S. wheat industry. Its mission is to increase the level of U.S. wheat exports. The goal of export market development is achieved by demonstrating the unique role of the United States as a reliable producer and supplier of a wide range of quality wheats and by encouraging the growth of world consumption of wheat and wheat products. Its resources are devoted exclusively to export market development, with activities performed in the United States providing support for the work carried out by USW offices around the world.

- USW is the only organization working exclusively on behalf of US wheat producers to develop markets for their grain around the world.
- USW is the only organization that provides wheat producers with the opportunity to meet directly with buyers of US wheat and to discuss a variety of market issues including market trends and prices, specifications, wheat quality as well as the end product being produced.
- USW is an extension of the 17 member state wheat commissions in the overseas marketplace.
- USW makes possible a united effort vs. individual state efforts.
- USW works to compete against exporters such as the EU, Canada, and Australia instead of states competing against one another.
- USW works to increase revenue to the wheat grower through increased volume of wheat exported.
- USW represents the producers' interests on trade issues with the U.S. Departments of Agriculture and State, the U.S. Trade Representative, and other departments and agencies as needed.

Programs

USW market development programs operate in more than 100 countries. Programs focus in four activity areas --market analysis, trade servicing, technical assistance and consumer education. These programs target the specific needs and opportunities of each export market.

These programs are carried out through activities such as:

- trade teams to the United States
- trainees to short courses at the International Grains Program in Manhattan, Kansas, Northern Crops Institute in Fargo, North Dakota, Wheat Marketing Center in Portland, Oregon, and American Institute of Baking in Manhattan, Kansas
- technical consultants overseas
- representation of wheat interests on trade and credit issues
- publications such as the Wheat Letter and Crop Quality Report
- seminars and workshops overseas
- training facilities
- crop quality survey and seminar

Funding

USW currently has 17 member states: ***Arizona, California, Colorado, Idaho, Kansas, Maryland, Minnesota, Montana, Nebraska, North Dakota, Ohio, Oklahoma, Oregon, South Dakota, Texas, Washington, and Wyoming.*** The Board of Directors is comprised of wheat producers from these states.

USW receives funding from state wheat producer check-off organizations and the U.S. Department of Agriculture's Foreign Market Development Program and Market Access Program. The share is roughly producer 36% and USDA 64%. Third party cooperators overseas contribute significant sums for activities conducted throughout the world in addition to goods and services provided by wheat producer organizations.

Offices

USW's two US offices are located in Arlington, Virginia (just outside Washington, D.C.) and Portland, Oregon. There are 14 overseas offices located in Mexico City, Santiago, Singapore, Manila, Tokyo, Seoul, Taipei, Rotterdam, Moscow, Casablanca, Beijing, Hong Kong, Cape Town and Lagos. USW employs just under 75 people worldwide.

Membership Contributions

The assessment process used to determine the financial contribution of each member state for FY2019 works as follows: After the USW Board of Directors approves a total budget for the fiscal year, an annual assessment figure is provided to each member state. The assessment is based on each state's wheat production using an average of the last five years as published by the U.S. Department of Agriculture, with the high and low production years eliminated. There are three classes of members – Full (paying 100% of assessment), Partial (paying 50% of assessment or more) and Contributing (paying less than 50% of assessment). Contributing members are not part of the assessment calculation. One assessment rate per bushel is determined for all states, thus Contributing members can determine what their full assessment would be by multiplying the assessment rate per bushel by their portion of average total production.

Votes

Votes on the board are proportionate to the actual financial contribution of each state with a 20% bonus for full members.

Privileges

The privileges (in addition to votes) of full membership in U.S. Wheat are as follows:

1. Board Team Travel Rotation - As a full member, each state is on a foreign travel rotation list for purposes of supervision, inspection and observation of USW foreign offices, personnel and programs (travel paid by USW with FAS funds). A state usually qualifies for travel about once every two years.

2. Officers - As a full member, a board member from one of three regions is nominated for election to the officer positions of Secretary-Treasurer, Vice-Chairman and Chairman. These terms are for one year, and the incumbent is usually elected to the next officer position (i.e., Vice-Chairman to Chairman, etc.).

FY2019 State Assessments

Arizona	$32,100
California	58,100
Colorado	277,300
Idaho	307,600
Kansas	1,045,800
Maryland	55,000
Minnesota	233,400
Montana	642,200
Nebraska	175,300
North Dakota	1,021,100
Ohio	125,600
Oklahoma	324,300
Oregon	141,900
South Dakota	313,000
Texas	241,900
Washington	428,300
Wyoming	12,200
TOTAL	$ 5,435,100

Because contributions from some states may differ from their assessment, the organization's budget is not equal to the total state assessment. The approved budget for FY2019 is $5,300,000.

- **Title of Project**: Development of new biotech traits in wheat for resistance against multiple viral diseases

- **Type of Project**: Research

- **New or Renewal:** Funded in 2016

- **Total amount Requested:** $10,000

- **Project Duration:** 12 months, July 01, 2018 to June 30, 2019

- **Principal Coordinator Name, Address, Phone, Fax, and E-mail**:

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USDA, Agricultural Research Service
Attention: Becky Braun, Budget Section
2150 Centre Avenue, Building D, Suite 300
Fort Collins, CO 80526-8119

Phone: 970-492-7021
Email: becky.braun@ars.usda.gov

- **Cooperating Institutions:** Dr. Bob Graybosch, USDA-ARS, Lincoln
  Dr. Tom Clemente, University of Nebraska-Lincoln

Project Abstract

Viral diseases of wheat cause significant yield losses in Nebraska and other Great Plains states in the USA. Among wheat viruses, *Wheat streak mosaic virus* (WSMV), *Triticum mosaic virus* (TriMV) and High Plains virus are economically important. Since all these viruses are transmitted by wheat curl mites, mixed infections with two or three viruses have been reported in growers' fields with exacerbated yield losses. When conditions are ideal for viruses and vector, these viruses can cause up to 100% yield losses in growers' fields. Hence, the development of wheat cultivars with resistance to multiple viruses will facilitate effective disease management. Recently, we developed transgenic wheat with a hairpin sequence of WSMV and TriMV with partial support from the Nebraska Wheat Board. The hairpin sequence induces the wheat host defense mechanisms to fight off the invading virus. The T3 transgenic wheat lines provided **dual resistance** to WSMV and TriMV with no detectable virus accumulation at 26^{o}C or higher. Wheat seed collected from T3 generation will be screened for dual resistance against WSMV and TriMV in T4 generation at different temperature regimens. Additionally, T4 transgenic wheat will be used for pyramiding the transgene into winter wheat lines/cultivars with naturally occurring temperature-sensitive *Wsm1* and *Wsm2* resistant genes. Developing wheat cultivars by pyramiding the transgene (RNAi) with *Wsm1* or *Wsm2* genes would provide long-lasting resistance to WSMV and TriMV under a wide range of temperature conditions.

Project Outcomes

This project will provide new biotech traits in wheat that could provide resistance to *Wheat streak mosaic virus* and *Triticum mosaic virus*. These new traits will provide source material for the development of commercial winter wheat cultivars with virus-resistance under a wide range of temperatures. The availability of virus-resistant wheat cultivars will minimize or eliminate yield losses due to viral diseases, which curtail the need for pesticide application for wheat curl mite control, thus provide ecofriendly production. Moreover, successful completion of this project will lead to the deployment of additional **'traits into wheat'** for agronomic development.

Method or Approach

Recently, transgenic wheat lines were developed with hairpin sequences derived from the polymerase gene sequences of WSMV and TriMV. In greenhouse-based experiments, several T3 transgenic wheat lines were found to be resistant to WSMV and TriMV (Figure 1) as no detectable virus was found in virus-inoculated wheat plants. In a preliminary experiment, virus-inoculated T3 transgenic wheat yielded substantially higher seed compared to non-transgenic wheat. These data indicate that transgene with viral hairpin sequence provided dual resistance to WSMV and TriMV.

Seed collected from T3 transgenic lines will be screened for virus resistance by rub inoculation of wheat seedlings at the two-leaf stage with crude sap of WSMV and/or TriMV. Initially, yield parameters of T4 transgenic wheat lines under greenhouse conditions will be determined from virus-inoculated and non-inoculated transgenic wheat. The copy number of transgene in transgenic wheat lines will be determined from T4 transgenic wheat plants by polymerase chain reaction (PCR) and Southern blot hybridization. The T4 transgenic wheat lines will be examined for virus infection by ELISA and PCR. Seed will be collected from T4

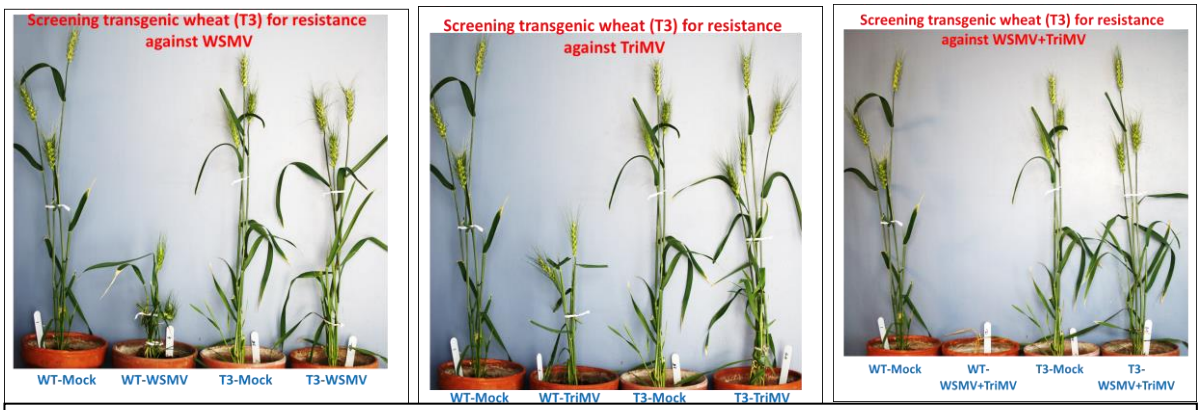

Figure 1. Screening T3 transgenic wheat for resistance against WSMV (left), TriMV (middle), and both (right). T3: T3 transgenic wheat; mock: buffer-inoculated wheat. WT: Non-transgenic wheat.

generation transgenic wheat for further screening in T5 generation.

Wheat lines/cultivars containing the *Wsm1* and *Wsm2* genes provide temperature-sensitive resistance to WSMV and TriMV, and WSMV, respectively. We propose to combine the hairpin transgene with those of *Wsm1* and *Wsm2* genes to pyramid multiple genes and provide more durable resistance against WSMV and TriMV at a wide range of temperatures. Seed collected from virus-resistant T3 transgenic wheat was used for introgression into wheat cultivars containing *Wsm1* or *Wsm2* genes. Plants with hairpin sequences were mated with Mace (*Wsm1*) and KS06HW79 (*Wsm2*). Currently, seed collected from F1 generation has been screened in the F2 for the presence of transgene and *Wsm1* or *Wsm2* genes. The F3 generation wheat will be screened for virus resistance against WSMV and TriMV at different temperature regimens as mentioned above.

Relevance

Successful completion of this project will provide wheat cultivars that are potentially resistant to multiple viruses. The availability of wheat with resistance to multiple viral diseases will minimize yield losses due to viral disease and increase profitability to wheat growers. The development of wheat cultivars with both natural and transgenic genes will help maintain resistance even if the pathogen evolves in nature.

Impact

Wheat streak mosaic disease is economically important disease complex caused by infection of wheat by WSMV, TriMV, and High Plains virus. Availability of transgenic wheat with resistance to these viruses, and introgression of transgenes into winter wheat cultivars with temperature-sensitive *Wsm*-gene will provide durable resistance to wheat streak mosaic disease complex. This technology will allow for the development of resistance against additional viruses as well as virus vectors (eg. wheat curl mites). Successful completion of this project will lead to the deployment of additional 'traits into wheat' for agronomic development.

Method suitability

The PI has experience in plant virology to conduct proposed experiments. The RNAi technology has been used in several plant systems for the control of viral diseases, and it has potential to work in wheat. The PI will collaborate with Drs. Bob Graybosch and Tom Clemente for successful completion of proposed experiments. The USDA-ARS established a non-funded Cooperation Agreement with the University of Nebraska-Lincoln for transformation of wheat lines.

Project Budget:

1. Chemicals and reagents= $10,000
2. Greenhouse charges=$0
3. Indirect costs = $0
4. Total request = $10,000

Other Funding Sources for this project: We will be using part of USDA-ARS CRIS project dollars to accomplish the proposed research.

WHEAT BOARD PROPOSAL BUDGET

PRINCIPAL INVESTIGATOR(S): S. TATINENI (T.S.)
PROJECT TITLE: Development of new biotech traits in wheat for resistance against multiple viral diseases.

A. Salaries and Wages	Year 1	Year 2	Institutional Investment
1. Co-principal Investigator(s)	$0		$10,000*
2. Senior Associates			
3. Research Associate - Post doctorate			
4. Other Professionals			
5. Graduate Students			
6. Prebaccalaureate Students.....			
7. Secretarial - Clerical.....	$0		$0
8. Technical, Shop, and Other.....			
B. Fringe Benefits - Grad. 41% PLUS Health Ins.			
C. Nonexpendable Equipment			
D. Materials and Supplies	$10,000		$0
E. Travel			
F. Greenhouse/growth chamber charges	$0		$0
G. Land fees and harvest			
H. All Other Direct Costs			
I. Indirect Costs	$0		
J. TOTAL AMOUNT OF THIS REQUEST	$10,000		$10,000*

* Cost sharing provided by USDA-ARS and other sources.

Nebraska Wheat Board Proposal-Cover Page

Title of Project: Response of wheat overexpressing lignin genes to Fusarium head blight.

Type of Project: *Research*

New or Renewal: New

Total Amount Requested: $10,000

Project Duration: July 1, 2018 - June 30, 2019

Project Coordinator Name, Address, Phone, Fax, and E-mail:
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Organization Name, Address, Phone, Fax, and E-mail:
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Additional Participating Institutions: University of Nebraska, University of Minnesota

Body of Proposal

Project Abstract: We will identify Fusarium head blight (FHB) resistance using lines overexpressing lignin, a defense against pathogens. We have transgenic lines overexpressing four different genes involved in lignin biosynthesis. **We have the tools needed to identify unique resistance sources**. We will test these lines at an FHB field nursery operated by University of Minnesota for screening of transgenic spring wheat. Our team is highly adept at performing crosses, FHB greenhouse screens, and biochemical analyses of plant cell walls. This research has **mutual interests with stakeholders**. We will identify lines with increased resistance or reduced accumulation of the toxin deoxynivalenol (DON), by stacking transgenes or introgressing them into elite susceptible or moderately-resistant backgrounds. We also will identify biochemical compounds that can be used as markers for resistance. These future resources are invaluable for development of wheat adapted for Nebraska with increased resistance to FHB or DON accumulation.

Project Outcomes: Likely outcomes will be resistant lines and markers for resistance that can be used in breeding FHB resistant wheat cultivars.

Method or Approach: FHB is an economically devastating disease of wheat and other small grain cereals that has potential to cause billions of dollars in losses when widespread epidemics occur. Research to identify unique sources of resistance to FHB is imperative. Response of lines with higher levels of lignin or lignin-like compounds in their cell walls, which may limit initial infection, has not been reported. **This is the only known project in which overexpression of lignin biosynthesis genes is being evaluated as a source of resistance to FHB in wheat.** Lignin is a complex organic polymer and an essential cell wall component that lends structure and support to all land plants. Lignin has been implicated as important in defense against pathogens and insects. The most direct way to alter lignin in plant cell walls is by overexpressing one or more genes from this pathway to modify lignin content and composition. In sorghum, we previously identified an intriguing response to pathogens in lines that carried mutations in two different lignin biosynthetic genes: grain from these mutants had reduced *Fusarium* infection as compared with wild-type. Therefore, we herein propose that changes in lignin content, composition, or compounds involved in defense in grain, from wheat with increased lignin, can result in inhibition of infection by the FHB pathogen.

We have transformed the moderately susceptible spring wheat, CB037, with overexpressed genes involved in lignin biosynthesis. We have identified lines with increased levels of one or more enzymes in this pathway. These lines are being screened for response to FHB under greenhouse conditions. Our preliminary results suggest that lines overexpressing two different lignin biosynthesis genes have significantly reduced infection by FHB as compared to the highly susceptible line Wheaton, and similar to that of the moderately-resistant check Sumai No. 3. Clearly, further analyses need to be accomplished to confirm these observations. **Funding this request will allow us to more rapidly complete assessment in the greenhouse and field of these transgenic lines altered in lignin as potential sources of FHB resistance.**

We propose to conduct the following analyses:

1) Field studies will be used to assess responses following artificial inoculation of transgenic lines at University of Minnesota's Outreach, Research and Education Park in Rosemount, through collaboration with Dr. Ruth Dill-Mackey. FHB severity, damaged kernels and DON analyses will be conducted.

2) The following crosses with transgenic lines will be made:

a) Transgenic lines will be crossed with other lines carrying transgenes to stack these genes.

b) Transgenic lines will be crossed with non-transgenic lines with moderate resistance to FHB to stack different resistance genes.

c) Transgenic lines will be crossed with non-transgenic elite lines that are susceptible to FHB to introgress increased FHB resistance with other highly desirable quality traits.

The progeny resulting from these crosses will be screened for resistance to FHB in the greenhouse by our research team. Grain will be collected and ground to be analyzed for DON levels and other toxins using an outside laboratory (*e. g.* North Dakota State University Veterinary Diagnostic Lab).

3) Biochemical analyses will be conducted using grain from homozygous transgenic lines displaying increased or reduced DON levels in progeny having the transgenes, as compared with untransformed susceptible lines. Compounds will be separated and identified using equipment in our laboratory and well-established techniques.

In this proposal, we are requesting funding for part-time student help to assist with planting studies and crossing blocks, preparing materials for and assisting with disease assessments, and collection and processing of grain and other plant materials for DON and biochemical analyses. **Not only will funding of this proposal expedite identification of lines with increased resistance to FHB, an undergraduate student will enhance their education with hands-on experience in scientific research.**

Relevance: As recently as the 2015 growing season, FHB and the accumulation of DON have severely affected the wheat crop in central and eastern Nebraska (http://cropwatch.unl.edu/wheat-disease-june-19-2015 ; https://jenreesources.wordpress.com/2015/05/17/wheat-scab-risk-increasing/). These intermittent epidemics are likely to continue, possibly with increased occurrences. Research to identify unique sources of resistance is imperative. We have strong evidence that modifications in the lignin biosynthesis pathway of sorghum actually can increase resistance to some *Fusarium* spp. grain pathogens. Previous studies have implicated the role of lignin in resistance to FHB in wheat, either by accumulation of lignin or biosynthetic intermediates immediately following infection or increased enzyme activity in the lignin biosynthesis pathway during infection. However, to our knowledge, no one has yet reported the response to FHB in wheat lines with increased lignin before infection. Therefore, we present a unique opportunity to utilize the resources and expertise we already have to identify new sources of resistant germplasm or markers for resistance to this destructive disease.

Impact: We will identify transgenic spring wheat lines with field resistance that can be used to develop elite spring wheat lines with increased resistance to FHB. Knowledge from this research

will allow for breeding Nebraska-adapted winter wheat with increased resistance to FHB and/or decreased DON accumulation. Identification of compounds that are associated with resistance or decreased DON accumulation can be used to screen winter wheat lines for development of FHB-resistant wheat specifically adapted for Nebraska. Results of this study will be prepared for publication in journals visible to the wheat research community. Research progress will be presented at the FHB conference and other scientific meetings.

Method Suitability: Techniques for inoculation of wheat for screening for FHB resistance are well-established. Our technologist, Mr. Zachary Duray comes to us from industry highly trained in FHB techniques. He regularly screens transgenic wheat lines using FHB pathogens isolated from Nebraska. Mr. Duray oversees planting, preparation of inoculum, inoculation and scoring of plants and collection, grinding and disposition of samples for analyses. For identification of metabolites involved in resistance, we have GC-MS equipment which is routinely used in our facility by highly-trained individuals. We collaborate with Dr. Ruth Dill-Mackey of University of Minnesota, for field evaluations, Dr. Stephen Wegulo of University of Nebraska, highly knowledgeable on FHB, to advise on greenhouse studies, and Dr. Robert Graybosch USDA-ARS, Lincoln, an expert in wheat genetics, to advise on crosses.

Budget

PROJECT TITLE: Response of transgenic wheat modified in lignin content to *Fusarium* head blight.		
A. Salaries and Wages	2016-2017	Proposed USWBSI* contribution
1. Co-principal Investigator(s)		
2. Senior Associates		
3. Research Associate - Post doctorate		
4. Other Professionals: 0.5 X technologist		$16,874
5. Graduate Students		
6. Prebaccalaureate Students: 1 @ $10,000	$10,000**	
7. Secretarial - Clerical		
8. Technical, Shop, and Other		
B. Fringe Benefits - (37% of salary)	N/A	$6,243
C. Nonexpendable Equipment		
D. Materials and Supplies		$7,000
E. Travel- for PI and technologist to present results at annual FHB conference		$2,000
F. Greenhouse/growth chamber charges- Rental on 450 sq. ft greenhouse bench space for one year. This rate includes pots, pasteurized soil, watering, fertilizing, pest control, lights and autoclaving infected plants and soil.		$5,180
G. Land fees and harvest		
H. All Other Direct Costs (publication costs)		$ 1,020
I. Indirect Costs	N/A	N/A
J. TOTAL AMOUNT OF THIS REQUEST	$10,000	$38,317

*United States Wheat and Barley Scab Initiative

**For the current proposal, we request one part-time student aide to assist the technologist with planting seed, inoculating plants, scoring results and collecting and grinding grain and other plant materials for biochemical analyses. Many of these tasks are repetitive and laborious. For this project to succeed in an expeditious and efficient manner, additional help is required.

Proposal to the Nebraska Wheat Board
2018 Farm Bill Education in Nebraska

New Education Proposal for July 1, 2018 – June 30, 2019
Funding Request: $6,131

Principal Investigator/Project Coordinator

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Organization

Board of Regents, University of Nebraska, University of Nebraska-Lincoln
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Abstract

Current farm programs authorized in the *Agricultural Act of 2014* are set to expire on September 30, 2018. New farm legislation, or at least an extension of current farm legislation, is expected to require producers (farmers and landowners) to make a new commodity program enrollment decision in 2019. This project will deliver needed information, analysis, and educational programming to provide producers increased understanding of programs, in-depth analysis of program options, and improved farm program enrollment and risk management decision-making.

The project team with Nebraska Extension will work in collaboration with the Nebraska Farm Service Agency on local farm bill education and will deliver additional information and educational programming through written and electronic outlets. The educational effort is proposed to combine support from the Nebraska Wheat Board, the Nebraska Corn Board, the Nebraska Soybean Board and the Nebraska Grain Sorghum Board to deliver the valuable information and program to Nebraska producers.

Outcomes and Methods

The educational strategy will engage producers (farmers and landowners) and other agricultural professionals through multiple methods and opportunities to address the information, analysis, and decision-making needs related to the 2018 Farm Bill. The strategies, objectives, and expected outcomes below provide details of the comprehensive effort.

Producer education meetings.

Educational meetings targeted to producers will be delivered in each of the 71 FSA local service areas in Nebraska in collaboration with local FSA offices and the Nebraska state office of FSA.

Follow-up analysis meetings will be scheduled in 20 regional locations to allow producers to study the enrollment decision and resulting risk management implications and decisions.

Online education and information.

Webinars will be scheduled and recorded to provide alternative educational delivery and availability to producers and other agricultural professionals that are unable to participate in face-to-face meetings or prefer the online delivery.

Ten fact sheets with program details and analysis will be developed and published on the website for producer information and reference. These will be supplemented with regular updates of announcements, analysis, and market information relevant to producer decisions.

Program evaluation and reporting.

The face-to-face meetings will include end-of-meeting evaluation. Coupled with data on utilization of web information, evaluation results, economic analysis, and reports will be developed and disseminated after the project is complete.

Timeline. The following approximate timeline provides a guide for planned educational efforts pending timely farm bill completion by September 2018.

July-September 2018	Initiate program planning and development of educational materials as potential farm bill language nears completion.

October-December 2018	Develop educational materials and fact sheets and engage in program training and planning to prepare for educational delivery.
January-February 2019	Deliver webinars and other web-based delivery as an initial educational effort across the state.
March-May 2019	Deliver educational meetings and follow-up analysis meetings timed to availability of farm program details, decision tools, and program enrollment periods at FSA.
June 2019	Compile evaluation results and report farm program and educational impacts.

Relevance, Impact, and Suitability

Whether under a new farm bill or an extension of current legislation, producers are expected to face a complicated farm program enrollment decision in 2019 between the Agriculture Risk Coverage (ARC) program and the Price Loss Coverage (PLC) program. Wheat producers were split in choosing between ARC and PLC in 2014 and based on changing market expectations, will need to carefully analyze their decision again before enrolling in 2019.

The proposed educational programs and online delivery of information and education will effectively meet the need for education and analysis to improve producer enrollment and risk management decisions. During the implementation of the 2014 Farm Bill, this team from Nebraska Extension delivered a similar educational effort, reaching nearly 15,000 participants in Nebraska with an impact estimated from survey respondents of more than $140 million.

Other Considerations

There are two unique issues which the PI/Co-PIs wish to bring to the attention of reviewers.

Timing. The educational effort is focused on farm bill implementation and commodity program enrollment decisions facing producers in 2019, which are relevant whether a new farm bill is completed on time or current programs are simply extended. If the development of program rules and the implementation of new programs is delayed such that enrollment begins later or runs through late summer 2019, the project would likely need an extension through December 2019 to provide ample time for all educational efforts and evaluation efforts.

Funding. As presented, the proposal to the Nebraska Wheat Board is for 10% of the total budgeted cost for the project. The total scope of the project would be affected by funding decisions from each of the separate proposed sources: the Nebraska Wheat Board (10%), the Nebraska Corn Board (40%), the Nebraska Soybean Board (40%), and the Nebraska Grain Sorghum Board (10%), but partial programming could proceed with partial funding.

A second funding issue references language in the 2014 Farm Bill that specifically called for farm bill education and provided funding to state Extension systems, including Nebraska. While this funding provided substantial support for the educational efforts in 2014, there is no indication or assurance of any farm bill education funding in the next farm bill. Even if funding is provided, it may be allocated to supplement the proposed efforts and the personnel commitment described above and not replace the role of the requested funding. If it serves as a substitute source of funds, the demand for funds from the Nebraska Soybean Board could be reduced as the program is delivered.

For Administrative Use Effective Dates	**PROPOSAL BUDGET**

PRINCIPAL INVESTIGATOR(S): PI: Bradley D. Lubben;
Co-PIs: Austin Duerfeldt, Jessica Groskopf, Jim Jansen, and Robert Tigner

PROJECT TITLE: 2018 Farm Bill Education in Nebraska

PROPOSED BUDGET SUMMARY See Narrative Below		FUNDS REQUESTED FOR FY **Year 1**	FY **Year 2**
A. SALARIES AND WAGES Commodity Board usually does not pay the cost for Project Investigators			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%, 40% or 50%			
2. Grad Student @ 38% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)			
D. TRAVEL	Domestic	$2029	
	Foreign		
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		$4102	
F. TOTAL AMOUNT OF THIS REQUEST		$6131	

INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.

BUDGET NARRATIVE:

A. Salaries & Wages

None requested

B. Fringe Benefits

None requested

C. Non-expendable Capital Equipment

None requested

D. Travel

- *Project planning, development, state training and evaluation meetings - 3 2-day meetings = $4,560*
- *National training meeting for 5 PI/Co-PIs - 1 3-day meeting = $2,850*
- *Producer education meetings - 71 meetings = $9,880*
- *Producer follow-up analysis meetings - 20 meetings = $3,000*

*Total travel = $20,290 * 10% Nebraska Wheat Board share = $2,029*

E. All Other Direct Costs

- *Broadband access and cards for online decision tool illustration and consultation - 5 cards for 6 months = $1,500*
- *Desktop seminar recording equipment for recorded videos and educational webinars - 5 web cameras and desktop recording software = $1,500*
- *Printed meeting materials for participants - 71 meetings * 80 participants and 20 meetings * 20 participants at $4 per participant = $24,320*
- *Publication costs for 10 fact sheets and reports = $4,000*
- *Meeting room fees for 3 planning and training meetings, 71 educational meetings, and 20 follow-up meetings = $9,700*

*Total Other Costs = $41,020 * 10% Nebraska Wheat Board share = $4,102*

Nebraska Wheat Board Research Project Proposal

Submitted to: Nebraska Wheat Board
Project Title: Improving Nitrogen Management in Dryland Winter Wheat Production
Type of Project: Wheat Production Research
Project Year/Time Period: New proposal. July 1, 2018-June 30, 2021. Year 1 of 3-year project
Total Amount Requested: $15,000 (Year 1 of 3)
Principal Investigators:
Bijesh Maharjan, Panhandle Research & Extension Center, 4502 Avenue I, Scottsbluff, NE 69361, PH: 308-632-1372, bmaharjan@unl.edu;
Cody Creech, Panhandle Research & Extension Center, 308-632-1266, ccreech2@unl.edu;
Dipak K. Santra, Panhandle Research & Extension Center, 308-632-1244, dsantra2@unl.edu;

Organizational Information:
University of Nebraska Lincoln, Panhandle Research and Extension Center, 4502 Avenue I, Scottsbluff, NE 69361, Email: scruz3@unl.edu, Phone: 308-633-3802, Fax: 308-632-1365

Project Abstract

Low protein levels caused Nebraska wheat producers to lose an estimated 2.3 – 9.6 million dollars of the value of the crop in 2016 despite high yields. Similar low protein issue persisted in 2017. Abundant precipitation in the spring and previous fall increases wheat production across the state. However, low protein levels for many producers offset any potential financial gains. The level of protein in the grain of wheat is primarily driven by the amount of nitrogen (N) available for the plant during grain fill. Thus, it is highly likely that insufficient N, coupled with partial loss of N from abundant precipitation, caused low protein levels in wheat in 2016 and 2017. The current dryland winter wheat N recommendations for Nebraska were developed in the 1970s. Considering the progress made in traits and management, and changing climatic conditions, this is high time to re-visit N recommendations for winter wheat.

Statement of Work

Research plots will be established in the fall of 2018, 2019, and 2020 at three locations across western Nebraska. Effects of the combination of different rates and application timing of N on the overall stand, yield, and grain quality will be assessed. At least at one location, crop sensor mounted on unmanned aerial system (UAS) will be tested to assess crop at different growth and estimate yield and grain quality. Data will be analyzed and used in presentations and publications to Nebraska wheat growers.

Project Outcomes

Nitrogen is commonly applied to dryland winter wheat in semi-arid Western Nebraska to achieve moderate to high yields. Nebraska winter wheat production for 2017 is estimated at 59.9 million bushels, a decrease of 6% over 2016. However, below-average protein levels were recorded for many producers at several locations in NE decreasing the value of the Nebraska wheat crop by as much as 10 million dollars. Among many potential factors, soil fertility is probably the most important factor that affected protein levels at harvest. Given low market prices, producers are under pressure to lower their input costs, fertilizers often being the primary

input that is reduced. Reducing or eliminating N applications to winter wheat will typically result in low protein when yields are high and/or residual soil N is low. Because of abundant precipitation during previous fall and following spring for both 2016 and 2017, soil N likely moved deeper into soil profile while the roots from the wheat plants grew laterally to access the abundant moisture near surface. The high level of soil moisture and favorable growing conditions increased tillering and wheat yield. As wheat yield increases, the requirement for N increases. In order to increase protein levels in wheat, N must be properly managed in the soil and be available for plant uptake during grain development. The interacting effect of N with available soil moisture becomes a contingent issue for a profitable winter wheat production.

Predicting wheat N needs accurately requires an extensive data set. A predictive N algorithm for winter wheat production in western Nebraska was last prepared in 1970s by duo Professor Emeriti Jurg M. Blumenthal and Donald H. Sander. Considering the progress made in traits and management, and changing soil and climatic conditions, the need for re-assessing N recommendation is warranted.

The objective of the proposed field study is to evaluate effects of the combination of different rates and application timing of N on the overall stand, yield, and grain quality. By conducting the study at locations that vary in average annual precipitation and length of growing season, we hope to be able to determine N recommendations that will maximize returns for western Nebraska wheat growers.

The study will be conducted on dryland production acres at the High Plains Ag. Lab. near Sidney, the Henry J. Stumpf International Wheat Center near Grant, and a grower cooperator location in Box Butte County. Average annual precipitation across these locations range from 14 to 20 inches. The elevation in feet above sea level for these locations ranges from 2800 to 4300. The differences in environmental conditions across locations will allow to develop N recommendation that covers the region with a range of soils, climate, and management practices.

Another objective is to test crop sensor mounted on UAS to assess crop at different growth stages and correlate in-season crop nutrient status to eventual crop yield and quality. This remote-sensing study will be conducted at one location out of three proposed above. If a significant correlation between crop sensor data and yield is established, that would establish potential of the remote-sensing technology in assessing crop status and recommending nutrient inputs.

Method or Approach

At each location, we will plant two commonly used wheat varieties and apply different rates of N at different application timings. Untreated controls will be included. N rates and timings will be determined using soil and plant tissue tests relative to the growth stage of the wheat crop at each location. Application timings will be fall, spring and split. Wheat emergence, stand counts, tillering, and height will be recorded in the fall. After initial green-up in the spring, similar measurements will be taken. Prior to harvest, plant height, number of plants and heads per foot of row, and percent lodging will be recorded. Plots will be harvested and wheat yield, test weight, moisture, and protein will be recorded. **The no-till drill (partially funded by the Wheat Board in 2015) will be used to plant the trials next to Wheat Variety Trials (also partially funded by the Wheat Board), when possible, for most economic use of the Board's investment to the University.**

The Soils Program (led by PI) at UNL Panhandle Research and Extension Center

has <u>UAS and crop sensor</u> required to address the second objective. A hexacopter equipped with MicaSense RedEdge, a 5-band multispectral sensor will be deployed at 3-4 different growth stages to collect spectral images which will be processed to generate vegetative indices (VI) for each treatment plot. Estimated VI at different stages will be correlated to wheat yield and quality.

*Project Locations***:** he High Plains Agricultural Laboratory located near Sidney, the Henry J. Stumpf International Wheat Center located near Grant, and a grower cooperator location in Box Butte County.

Timeline: Establish plots in the fall of 2018, 2019, and 2020. Measurements will be taken during the growing period of the wheat. Wheat will be harvested in the summer of 2019, 2020, and 2021. Data will be analyzed and made available as it becomes available and a final report summarizing the findings will be completed soon after the last year of data is collected.

Technology Transfer: Results from this study will be shared with USDA-NRCS personnel, discussed at grower meetings, summer field days, professional scientific meetings, and in news releases, posted to the University's web site, and published in Extension publications and scientific journals.

Potential Impact of Project Results

Results from this study will provide dataset to develop up-to-date N recommendation for dryland winter wheat grown in semi-arid western Nebraska. With this information, growers will be able to select N rate and timing that provide the greatest benefit for their operations. Potential of using remote-sensing technology will be determined.

Budget

For Administrative Use *Effective Dates: 7/1/18-6/30/19*	***PROPOSAL BUDGET***		
PRINCIPAL INVESTIGATOR(S): Dr. Maharjan, Dr. Creech, Dr. Santra *PROJECT TITLE: Improving Nitrogen Management in Dryland Winter Wheat Production*			
PROPOSED BUDGET SUMMARY *See Narrative Below*	*FUNDS REQUESTED FOR* *FY19*	*FY20*	*FY21*
	Year 1 of 3	***Year 2 of 3***	***Year 3 of 3***
A. SALARIES AND WAGES Commodity Board usually does not pay the cost for Project Investigators			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other	*$5,000*	*$5,000*	*$5,000*
7. Undergraduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%, 40% or 50%	*$2,500*	*$2,500*	*$2,500*
2. Undergrad Student @ 8.1%			
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)			

D. TRAVEL	*Domestic*	*$3,000*	*$3,000*	*$3,000*
	Foreign			
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		*$4,500*	*$4,500*	*$4,500*
F. TOTAL AMOUNT OF THIS REQUEST		*$15,000*	*$15,000*	*$15,000*
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.				

BUDGET NARRATIVE:

A. Salaries & Wages ($5,000): Funding for technician's salary (1.76 person months) who will assist with planting/data collection.

B. Fringe Benefits ($2,500): Personnel benefits are estimated at the rates shown below. The actual cost of benefits for each person will be charged to the project.

Fringe Benefit Estimates				
Base Salary > $70,000	30%		Graduate Students*	38%
Base Salary $40,000 - $70,000	40%		Part-Time Employees (less than 0.5 FTE)	8.1%
Base Salary <=$40,000	50%		Undergraduate Students (Full Time)	0%

C. Non-expendable Capital Equipment: N/A

D. Travel ($3,000): Funding for the travel to field plot for field trials, including data collections. Expenditures to include, but not limited to, mileage, fuel, rental, lodging, meals.

E. All Other Direct Costs ($4,500): Includes funding for publication, general field supplies as needed to complete the project, and lab testing fees for soil tests, tissue tests, and protein tests plus drill and combine rents.

Nebraska Wheat Board

Project Title: Optimizing Planting Date, Seeding Rate, and Row Spacing to Maximize NE Wheat Yields.
Type of Project: Wheat Production Research
Project Year/Time Period: New. July 1, 2018 – June 30, 2019.
Principal Investigators: Cody Creech, Panhandle Research & Extension Center, 308-632-1266, ccreech2@unl.edu;

Executive Summary: Selecting the appropriate planting date, seeding rate, and row spacing is critical to establishing a wheat crop that will attain its full yield potential. This research will evaluate current recommendations for planting winter wheat in western Nebraska in addition to alternative possibilities. This research will be conducted over multiple years and locations to ensure the correct conclusions and recommendations can be drawn. By understanding the interaction that occurs when planting different wheat varieties at different locations, on different dates, using different seeding rates and row spacing, Nebraska wheat growers will be able to optimize their wheat yields.

Statement of Work: Research plots were established in the fall of 2016 and 2017 near Hemingford, Sidney, Kimball, Grant, and Curtis, NE. Wheat stand counts and tillering will be recorded in the fall. After initial green up in the spring, similar measurements will be taken. Prior to harvest, plant height and number of plants per foot of row will be recorded. The number of wheat heads per foot of row will also be recorded. Plots will be harvested and wheat yield, test weight, and moisture will be recorded. Data will be analyzed and used in presentations and publications to NE wheat growers.

Project Description: Successful establishment of winter wheat in the fall is imperative to achieve the desired yields the following summer. Choice of variety, planting date, seeding rate, and row width have all been reported to impact wheat yields. An article on wheat seeding rate posted to the University of Nebraska's CropWatch website the first week of September of 2015 received over 1,100 views during the same month which ranked as one of the top three articles viewed that month. Currently, much of the information provided to Nebraska wheat growers is based on research from surrounding states and even as far as Oregon. Growers in Nebraska use seeding rates for winter wheat that vary from 30 to 180 pounds per acre. Recently, Nebraska Extension personnel recommended a change for seeding winter wheat from pounds per acre to seeds per acre because of the amount of variability observed in the number of seeds per pound. We are unaware of any scientific data from western Nebraska that considered the impact of multiple winter wheat establishment variables and their subsequent impact on winter wheat yield. Previous studies were narrow in scope and only evaluated a few of the variables at a time. In order to provide the most accurate recommendations, this study will consider location, variety, planting date, seeding rate, and row spacing. We hypothesize that by considering all the agronomic variables, improved recommendations that can enhance the productivity of wheat growers in Nebraska will be identified.

The study is currently being conducted on dryland production acres at the High Plains Ag. Lab. near Sidney, the Henry J. Stumpf International Wheat Center near Grant, and with grower

cooperators near Hemingford, Maywood, and Kimball. Average annual precipitation across these locations range from 14 to 20 inches. The elevation in feet above sea level for these locations ranges from 2800 to 4300. The differences in environmental conditions across locations will allow for comparison of treatments under different environmental stress helping to validate our conclusions.

At each location, we planted three commonly used wheat varieties at three different planting dates. At each planting date, we planted the wheat on 7.5 and 10 inch rows. Seeding rates were tailored to the area to maximize production. In addition to the current recommended seeding rate, two lower and two higher rates were used. Wheat stand counts and tillering were recorded in the fall. After initial green up in the spring, similar measurements will be taken. Prior to harvest, plant height and number of plants per foot of row will be recorded. The number of wheat heads per foot of row will also be recorded. Plots will be harvested and wheat yield, test weight, and moisture will be recorded. At each location, soil moisture and environmental conditions will be monitored and recorded. The study will be repeated at the same locations the following years.

The objective of the proposed field study is to quantify the impact of planting date, seeding rate, and row spacing on winter wheat stand, yield, and grain quality. By conducting the study at locations that vary in average annual precipitation and length of growing season, we hope to be able to delineate which practices should be recommended for each area.

Timeline: Establish plots in the fall of 2016 and 2017. Measurements will be taken during the growing period of the wheat. Wheat will be harvested in the summer of 2017 and 2018. Data will be analyzed in the fall of 2018 and made available in the fall of 2018.

Project Locations: The High Plains Agricultural Laboratory located near Sidney, the Henry J. Stumpf International Wheat Center located near Grant, and grower cooperators located near Hemingford, Kimball, and Curtis, NE.

Technology Transfer: Results from this study will be shared with USDA-NRCS personnel, discussed at grower meetings, summer field days, professional scientific meetings, and in news releases, posted to the University's web site, and published in Extension publications and scientific journals.

Potential Impact of Project Results: Results from this study will provide evidence either in support of or against the current recommendations for planting winter wheat in Nebraska. With the improved information gathered from this research, growers will be able to better select planting dates, seeding rates, and row spacing to optimize the yield potential of their wheat crop.

Budget:

For Administrative Use *Effective Dates: 7/1/18-6/30/19*	***PROPOSAL BUDGET***
PRINCIPAL INVESTIGATOR(S): Dr. Creech *PROJECT TITLE: Optimizing Planting Date, Seeding Rate, and Row Spacing to Maximize NE Wheat Yields.*	
PROPOSED BUDGET SUMMARY *See Narrative Below*	*FUNDS REQUESTED FOR*

		FY19
		Year 1
A. SALARIES AND WAGES Commodity Board usually does not pay the cost for Project Investigators		
1. Senior Associates		
2. Research Associates – Post doctorate		
3. Other Professionals		
4. Prebaccalaureate Students		
5. Secretarial – Clerical		
6. Technical, Shop, Other		
7. Undergraduate Students		*$6,475*
B. FRINGE BENEFITS		
1. Faculty & Staff @ 30%, 40% or 50%		
2. Undergrad Student @ 8.1%		*$525*
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)		
D. TRAVEL	*Domestic*	*$6,000*
	Foreign	
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		*$2,000*
F. TOTAL AMOUNT OF THIS REQUEST		*$15,000*
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.		

BUDGET NARRATIVE:

A. Salaries & Wages ($6,475): Funding for 1 undergraduate student (approximately 4 months) who will assist with field preparation, data collection, and other tasks related to project objectives.

B. Fringe Benefits ($525): Personnel benefits are estimated at the rates shown below. The actual cost of benefits for each person will be charged to the project.

Fringe Benefit Estimates				
Base Salary > $70,000	30%		Graduate Students*	38%
Base Salary $40,000 - $70,000	40%		Part-Time Employees (less than 0.5 FTE)	8.1%
Base Salary <=$40,000	50%		Undergraduate Students (Full Time)	0%

C. Non-expendable Capital Equipment: N/A

D. Travel ($6,000): Funding for the travel to field plots and extension/professional meetings as they relate to the overall project. Expenditures to include, but not limited to, mileage, fuel, rental, lodging, meals.

E. All Other Direct Costs ($2,000): Funding for the purchase of supplies necessary to carry out project objectives, including but not limited to, chemicals (fungicides, herbicides), fertilizer, seed packets, stakes, flags, harvest bags, fuels for machinery, etc.

Nebraska Wheat Board

Project Title: Updating the Wheat Page of CropWatch
Type of Project: Wheat Production Research
Project Year/Time Period: New project. July 1, 2018 – June 30, 2019. Year 1 of 1-year project.
Principal Investigators: Cody Creech, Panhandle Research & Extension Center, 308-632-1266, ccreech2@unl.edu; Dipak Santra, Panhandle Research & Extension Center, 308.632.1244, dsantra2@unl.edu

Executive Summary: The dedicated wheat page of CropWatch (https://cropwatch.unl.edu/wheat) is the primary method of disseminating research results, recommendations, and other information related to wheat production. Initial meetings have been held regarding the design, content, and improvements needed on the site to enhance the experience for wheat growers and others seeking information about Nebraska wheat. Updating the overall flow, content and design is relatively easy to do. One area that can be greatly improved is the Variety Testing and Virtual Variety Tour. The new tool will greatly enhance the user experience to search different ratings and have access to historical data. In addition, a new tool for planting recommendations will be developed.

Statement of Work: Funding will be used to develop two new decision support tools and to improve the overall appearance and flow of the page. The variety tool will be based on a similar tool developed by Drew Lyon at Washington State University (WSU) (http://wheattools.wsu.edu/Applications/Wheat%20Variety%20Selection). This will be modified and updated to best fit the needs of NE growers. Archived yield data will be organized to be easier to sort and find. The tool will include pictures, video, and a searchable table of all associated traits. The second tool will aid producers in calculating seeding rates for different planting dates and varieties. This will use recent Nebraska Wheat Board funded research to put the information in the hands of the producers.

Project Description: Key personnel, including Lisa Jasa (CropWatch administrator), Nathan Mueller (Extension Educator), Dave Ostdiek (Communications), and Cody Creech will finalize the desired outcomes for the tools and web page in early summer of 2018. Many of the updates will include ideas from the WSU wheat and small grains web page. Improvements will include pictures, video of Stephen Baenziger talking about each variety, and updated ratings on desired traits that will be tabulated to allow for easy comparison among varieties.

The tools and ideas would be presented to IANR Media who has several programmers and designers who can assist in developing a user-friendly tool for Nebraska producers. The tools will be designed and updated annually as new data is collected from variety trials. These tools will be available in time for aiding producers in making planting decisions in 2018.

The objective of the proposed webpage update is to provide new and archived research results and recommendations to Nebraska wheat producers in a manner that is easy to use, understand, and navigate. Expected outcomes include increased usage of the wheat webpage, better selection of wheat varieties adapted to different regions and needs, and searchable historical research.

Timeline: Project will get underway this summer with hopes of having the tools and updated webpage available before wheat planting begins in 2018.

Project Locations: CropWatch Wheat Webpage

Technology Transfer: Page will be widely viewed by growers in Nebraska and the surrounding region to aid in wheat production decisions.

Potential Impact of Project Results: Results from this will serve NE growers, saving time and ensuring they can easily access current and previous work related to wheat in a manner that is easy and helpful. Expected outcomes include increased usage of the wheat webpage, better selection of wheat varieties adapted to different regions and needs, and searchable historical research.

Budget:

For Administrative Use *Effective Dates: 7/1/18-6/30/19*		***PROPOSAL BUDGET***
PRINCIPAL INVESTIGATOR(S): Dr. Creech *PROJECT TITLE: Wheat Production Research*		
PROPOSED BUDGET SUMMARY *See Narrative Below*		*FUNDS REQUESTED FOR FY19*
		Year 1
A. SALARIES AND WAGES Commodity Board usually does not pay the cost for Project Investigators		
1. Senior Associates		
2. Research Associates – Post doctorate		
3. Other Professionals		
4. Prebaccalaureate Students		
5. Secretarial – Clerical		
6. Technical, Shop, Other		
7. Undergraduate Students		
B. FRINGE BENEFITS		
1. Faculty & Staff @ 30%, 40% or 50%		
2. Undergrad Student @ 8.1%		
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)		
D. TRAVEL	*Domestic*	
	Foreign	
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		*$10,000*
F. TOTAL AMOUNT OF THIS REQUEST		*$10,000*
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.		

BUDGET NARRATIVE:

A. Salaries & Wages: N/A
B. Fringe Benefits: N/A
C. Non-expendable Capital Equipment: N/A
D. Travel: N/A
E. All Other Direct Costs ($10,000): Funding for the University of Nebraska-Lincoln's media cost for web development and design per the project objectives.

Nebraska Wheat Board

Project Title: Increasing Research Capabilities and Plot Harvest Efficiency in Western Nebraska
Type of Project: Wheat Production Research Equipment Request
Project Year/Time Period: New project. July 1, 2018 – June 30, 2019. Year 1 of 1-year project.
Principal Investigators: Cody Creech, Panhandle Research & Extension Center, 308-632-1266, ccreech2@unl.edu;

Executive Summary: The dryland cropping systems program has continued to grow and expand. Last year, over 3,000 wheat plots were harvested. Wheat will continue to be the research and extension focus of the program into the future. Having an effective and efficient plot combine is imperative to providing quality data. Harvest issues the past few years have increased variability in yield data making it difficult to find differences between treatments. A new combine with new technology will increase efficiency and quality of data collected.

Statement of Work: With support from the NE Wheat Board, IANR, and faculty at the Panhandle Research and Extension Center, a new small plot combine will be purchased to facilitate dryland crop research in western NE.

Project Description: Currently, the dryland crops program uses plot combines manufactured in 1980 and 1997 that require, in some cases, manual collection of grain to be processed separately. The dryland crops program's greatest need is during wheat harvest in July. Other faculty at PREC might not harvest near the quantity of plots or have the need for a dedicated plot combine but would benefit from having available a combine. Most of these specialists have relied on hand-harvesting in the past to generate yield data which is time consuming and does not generate as reliable of date. Furthermore, this new combine would serve as a backup machine for the dry bean breeding program and for faculty located at West Central.

Key features of the new plot combine would include the ability to obtain clean wheat samples crops. The combine will have a cab and the ability to collect grain samples from inside the cab for employee safety. The weigh system will be the top industry standard and will quickly and accurately collect total weight, moisture, and test weight of each plot. Lastly, the combine must be compact enough to allow for easy transport on a trailer to different research locations around the Panhandle and into the West Central district.

The availability of a new plot combine to faculty at the PREC would allow for larger and more complex studies to be conducted because of the ease of harvest and yield data collection. Faculty will collaborate on multi-disciplinary teams to develop innovative research and also share available equipment resources. The addition of a plot combine will position faculty at PREC to competitively seek outside funding opportunities for research that previously was logistically impossible to conduct because of the lack of an efficient means to harvest plot areas.

Other expected outcomes would include additional extramural funding opportunities and facilitate collaboration on projects that were previously unmanageable. Data collection from research plot crop yields would be collected in a timelier manner, with more accuracy, while

using fewer employees. More importantly, the combine will enhance the research that addresses areas of importance to growers in Nebraska's Panhandle.

Timeline: A bid process has been initiated to expedite the arrival of the new plot combine due to a 4-5 month lead time from when the order is placed. It is anticipated that delivery will occur scheduled for early June in time for wheat harvest.

Project Locations: The High Plains Agricultural Laboratory located near Sidney, NE.

Technology Transfer: N/A

Potential Impact of Project Results: The combine will enhance ongoing wheat related research with efficiency and quality. More importantly, it is anticipated that numerous extramural funding applications will be submitted over the years that will directly benefit from having access to this machine. As one primary research focus in the PREC is wheat, it is anticipated that applications for funding will be submitted to the Nebraska Wheat Board annually that will benefit directly from this equipment. Another opportunity that works well for PREC faculty is USDA grants (NIFA, AFRI). These grants often require multi-disciplinary teams to work on agricultural production systems which is an easy proposition for the faculty at PREC. Currently, an IPM grant submission is being planned that will require this new combine. The project will focus on relay cropping wheat and dry bean and the how this system increases profitability and sustainability, reduces weed pressure, and facilitates the adoption biological pest control of for western bean cutworm that is currently in early phases of development.

Budget:

For Administrative Use *Effective Dates: 7/1/18-6/30/19*	***PROPOSAL BUDGET***
PRINCIPAL INVESTIGATOR(S): Dr. Creech *PROJECT TITLE: Increasing Research Capabilities and Plot Harvest Efficiency in Western Nebraska*	
PROPOSED BUDGET SUMMARY *See Narrative Below*	*FUNDS REQUESTED FOR FY19*
	Year 1
A. SALARIES AND WAGES Commodity Board usually does not pay the cost for Project Investigators	
1. Senior Associates	
2. Research Associates – Post doctorate	
3. Other Professionals	
4. Prebaccalaureate Students	
5. Secretarial – Clerical	
6. Technical, Shop, Other	
7. Undergraduate Students	
B. FRINGE BENEFITS	
1. Faculty & Staff @ 30%, 40% or 50%	
2. Undergrad Student @ 8.1%	
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)	*$10,000*

D. TRAVEL	*Domestic*	
	Foreign	
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		
F. TOTAL AMOUNT OF THIS REQUEST		*$10,000*
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.		

BUDGET NARRATIVE:

A. Salaries & Wages: N/A
B. Fringe Benefits: N/A
C. Non-expendable Capital Equipment ($10,000): Funding for the partial purchase of a new plot combine per the project objectives.
D. Travel: N/A
E. All Other Direct Costs: N/A

NE Wheat Board Research Project Proposal

Submitted to: Nebraska Wheat Board
Project Title: Improving Proso Millet Varieties for Nebraska
Type of Project: Research
NEW
Total Amount Requested: $20,000
Project Duration: July 1, 2018 to June 30, 2019
Principal Investigator: Dipak K. Santra, Alternative Crops Breeder, email: dsantra2@unl.edu, Phone: 308.632.1244; Panhandle Research and Extension Center, 4502 Avenue I, Scottsbluff, NE 69361, Fax: 308.632.1365
Organization: University of Nebraska Lincoln, Panhandle Research and Extension Center, 4502 Avenue I, Scottsbluff, NE 69361, Email: scruz3@unl.edu, Work Phone: 308.633.3802, Fax: 308.632.1365

Body of Project

Abstract
Proso millet is an integral rotational crop in dryland wheat production system in northwest Nebraska, home of the state's 50% wheat acreage. Goal of UNL Proso millet breeding program, the ONLY one in the country, is to develop genetically improved and high yielding varieties. This project is to support partially the proso millet breeding program. **Objectives are to:** (1) evaluate proso millet germplasm for traits necessary to improve proso millet varieties (e.g. synchronized seed maturity, resistance to lodging and seed shattering, traits for human food grade quality millet) and (2) use new lines in crossing. Proso millet materials will be evaluated in field. Selected lines with target traits will be used in crossing and breeding lines will be advanced and evaluated in green house and field during the breeding cycles. This project focuses on developing proso millet varieties for traditional bird feed and alternative uses (e.g. human food and beverages).

Project Outcomes

Proso millet is the most common alternative crop for dryland cropping system in western Nebraska, the highest wheat producing area in the state. It is an ideal crop in reducing fallow intensity in crop production cycles in the region and therefore, is the common rotational crop in all types of wheat based dryland cropping systems in the region. When used in the crop rotation, proso millet benefits wheat productivity in several ways. Proso millet as preceding crop controls winter annual grass weeds in following wheat fields and reduces disease and insect pressure. Proso millet's shallow root system and short duration preserve deeper soil water that following wheat can use in the spring. Winter wheat that is no-till planted into millet stubble is less prone to damage from blowing soil and benefits from increased snow capture compared to wheat planted into summer fallow or following other crops (e.g. pea, sunflower, corn). Additionally, it is an excellent rescue (or opportunity) crop to replant failed-wheat fields due to either hail storm, severe winter-kill or diseases. Therefore, adding proso millet as a summer crop spreads the workload and reduces both production and marketing risks of Nebraska wheat industry.

Maturity of grains in a single proso millet head is not synchronized and slow. Millet grain maturity and drying starts at top of the head and slowly proceeds downward. This is unlike wheat where kernel maturity and drying start at the middle and moves towards up- as well as down-ward. This is one of the reasons, why proso millet takes relatively longer time compared to wheat before most of the grains in heads are matured and dry enough for combining. Besides, proso millet is highly susceptible to lodging and seed shattering. All these results in severe grain loss if the crop is delayed for harvesting in the field. To minimize the yield loss, conventionally proso millet is first cut when reaches physiological maturity (indicated by yellow stem and brown heads but grains are not dry enough for threshing), then windrowing for drying and followed by threshing. This method also adds grain loss from weather (in case of heavy rain and high winds) when plants are lying in the field. The best solution for this is to use lodging and shattering tolerant varieties and combine directly instead of swathing. Unfortunately, there is no suitable proso millet variety for direct harvesting due to non-uniform maturity and lack of resistance to lodging and seed-shattering. Genetic research for improving these important traits through evaluation and efficient utilization of germplasm into the breeding program is extremely limited. Until recently by our program (Santra's), there was no significant research on screening the proso millet germplasm for these traits, understanding genetics, and developing DNA markers for these traits, which are extremely critical for genetic improvement of proso millet. Overall goal of the proso millet

program is to develop improved proso millet varieties for Nebraska. Specific objectives for this proposal are to: (1) evaluate proso millet germplasm for traits necessary to improve proso millet varieties (e.g. synchronized seed maturity, resistance to lodging and seed shattering, traits for human food grade quality millet) and (2) use new lines in crossing and rapidly advance the population in winter using off-season nursery.

Method or Approach

Proso millet genetic (germplasm) and breeding (F_2, F_3, $F_{3:4}$ head rows) populations will be evaluated in the field of 2018 at the High Plains Ag. Lab as replicated trials. For lodging tolerance, lines will be planted in rows with 3 replications in the field. Angle of lodging will be measured in degree (^{0}) before harvesting (1^0, 45^0, 65^0, and 90^0) and approximate % of the plants in the rows lodged will be recorded. Lodging score (LS) = Angle (^{0}) of lodging X Percent (%) plants lodged. For uniform seed maturity we will determine number of days necessary for 90% of grains in panicle to reach physiological maturity from heading date. We will determine two parameters: (1) physiological maturity measuring leaf chlorophyll content, and (2) % of grain moisture starting from physiological maturity at 3-4 days interval. Leaf chlorophyll will be measured using chlorophyll meter (Model: SPAD 502 Plus) (http://www.specmeters.com/nutrient-management/chlorophyll-meters/chlorophyll/spad502p/) starting at seed setting stage 2-3 days interval. The lines which will have least time between physiological maturity and near zero chlorophyll will be chosen as early maturity lines. Portable grain moisture meter (MODEL: SUPERPRO http://supertechagroline.com/?page_id=988) will be used to measure % grain moisture from the top, middle and bottom portion of the panicle. The lines which will have least time between physiological maturity and harvestable moisture (12%) at top and bottom grains will be selected as uniform maturity lines. Seed-shattering will be assayed measuring breaking tensile strength (BTS) to detach grain from panicle using digital force gauges. For human food grade quality evaluation, harvested grains will be used to measure traits such starch, protein, crude fat, and fiber. For 2nd objective, selected genotypes with target traits mentioned above will be planted in the greenhouse for crossing to develop F_1. Hybrids will be advanced to generate early generation breeding populations ($F_2 – F_4$), which will then be evaluated in the field following the methods described above. The selected lines will be planted in off-season nursery in Arizona for simultaneous seed increase and advancing generation. This is will speed up variety development time.

Research locations: Field trials will be conducted at the High Plains Ag. Lab facility, near Sidney (Cheyenne Co.). Crossing and population advancement will be done in the green house at the Panhandle Research and Extension Center (PHREC), Scottsbluff. Necessary molecular marker work will be conducted in the Alternative Crops Breeding laboratory at the PHREC, Scottsbluff.

Technology Transfer: Results will be disseminated at grower meetings, field days, research reporting sessions, and through written and electronic publications.

Relevance

The Nebraska Wheat Board is interested in funding research that will make Nebraska wheat industry profitable and competitive. Proso millet is the best rotational crops for wheat producers in western half of Nebraska and it improves wheat productivity. This work will lead to high yield yielding and directly harvestable proso millet varieties. Direct harvestable varieties would reduce cost of production when wheat producers use proso millet as rotation crop preceding to wheat

Potential Impact

Long-term impact of continuous support to such project will be development of new proso millet cultivars, which are suitable for both direct harvesting besides having option of conventional harvesting method (swathing and threshing). The wheat producers in Nebraska will have new cultivars to choose for dryland farm to rotate with winter wheat. The short-term impact is (1) identification of new source of lodging and seed-shattering tolerance, uniform maturity, and (2) generation of new crosses, new breeding populations, which are foundation of future millet varieties.

Project Budget and Justification

For Administrative Use *Effective Dates: 7/1/18-6/30/19*	***PROPOSAL BUDGET***	
PRINCIPAL INVESTIGATOR(S): Dr. Santra *PROJECT TITLE: Improving Proso Millet Varieties for Nebraska*		
PROPOSED BUDGET SUMMARY *See Narrative Below*	*FUNDS REQUESTED FOR* *FY19*	*FY*
	Year 1	***Year 2***

A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other		*$5,234*	
7. Undergraduate Students		*$8,000*	
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%, 40% or 50%		*$2,618*	
2. Undergrad Student @ 8.1%		*$648*	
C. NON-EXPENDABLE CAPITAL EQUIPMENT *($5,000 or more; more than 2 years use)*			
D. TRAVEL	*Domestic*	*$2,000*	
	Foreign		
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		*$1,500*	
F. TOTAL AMOUNT OF THIS REQUEST		*$20,000*	
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.			

BUDGET NARRATIVE:

A. Salaries & Wages ($13,234):

a. Funding for technician's salary (1.85 person months) who will assist with field trials and green house crossing.

b. Funding for 5-months (June to October) salary of a temporary employee (undergraduate intern/visiting research scholar/summer help) @ $10/hr. who will assist with collecting data.

B. Fringe Benefits ($3,266): Personnel benefits are estimated at the rates shown below. The actual cost of benefits for each person will be charged to the project.

Fringe Benefit Estimates				
Base Salary > $70,000	30%		Graduate Students*	38%
Base Salary $40,000 - $70,000	40%		Part-Time Employees (less than 0.5 FTE)	8.1%
Base Salary <=$40,000	50%		Undergraduate Students (Full Time)	0%

C. Non-expendable Capital Equipment: N/A

D. Travel ($2,000): Funding for the travel to field plot for field trials, including data collections. Expenditures to include, but not limited to, mileage, fuel, rental, lodging, meals.

E. All Other Direct Costs ($1,500): Plant breeding require extensive supplies, e.g. paper bags, labels, plot stakes, and miscellaneous greenhouse supplies (e.g. soil, fertilizer, pots), miscellaneous supplies for field trials (fuel, planting and harvest bags) to maintain the extensive field plot equipment necessary for the project. This also includes part of greenhouse rental fees.

Summary of Accomplishments

Nebraska Wheat Board has graciously supported the proso millet breeding program in the past. The Board funded $20,790 in FY'15 and $10,000 in HY'17. This and other funds ('Multi-State Hatch, and 'Crossroads Coop & Friends of the Proso Millet Research Fund') together made it possible to accomplish the following accomplishments in proso millet breeding, genetics and developing food products.

- First waxy millet variety 'Plateau' was released and PVPed. Commercial production started in 2017 in Nebraska. The new variety will which would lead its production as Identity Preserved (IP) crop for specialty food products in domestic and international market. This will results in expansion of proso millet industry beyond traditional bird feed market to human food market.
- Germplasm for few important agronomic traits (tolerance to seed-shattering and lodging, early flowering, seed size) were identified and are being used in crossing. Germplasm with better resistance to lodging and seed-shattering must be identified/created for developing variety for direct harvest.
- A FIRST genetic linkage map of proso millet was developed and published. Putative genes/QTLs and associated DNA markers for few traits were identified. More research will be needed to before these can be used in proso millet breeding.

All these and similar future research are critically important to continue genetic improvement of proso millet and expanding its market beyond traditional bird feed into human food sector.

Last 3-years publications:

- Wang, L.; Gulati P., **D. K. Santra**, D. Rose, and Y. Zhang (2018). Nanoparticles prepared by proso millet protein as novel curcumin delivery system. *Food Chemistry*. 240: 1039-1046
- Romero, H. A., **Santra, D.K.**, Rose, D., Zhang, Y. (2017). The dough rheological properties and texture of gluten-free pasta based on proso millet flour. The dough rheological properties and texture of gluten-free pasta based on proso millet flour. *Journal of Cereal Sciences*. 74: 238-243.
- Gulati, P., Li, P. A., Holding, D., **Santra, D. K.**, Zhang, Y., Rose, D. (2017). Heating reduces proso millet protein digestibility via formation of hydrophobic aggregates. *Journal of Ag. & Food Chem* 65 (9) 1952-1959 (DOI: 10.1021/acs.jafc.6b05574)
- Rajput, S., **D. K. Santra**, J. Schnable (2016). Mapping QTLs for morpho-agronomic traits in proso millet (*Panicum miliaceum* L.). Mol Breeding. 36: 37.
- Rajput S., and **D. K. Santra** (2016). Evaluation of genetic diversity of proso millet (*Panicum miliaceum* L.) germplasm available in the USA using SSR markers. Crop Sci. 56: 1-9.
- **Santra D. K.**, R. Heyduck, D. D. Baltensperger, R. A. Graybosch, L. A. Nelson, G. Frickel, and E. Nielsen (2015). Registration of 'Plateau' waxy (amylose-free) proso millet. J Plant Reg. 9: 41-43.
- Gulati P., S. A. Weier, D**. K. Santra**, J. Subbiah, and D. Rose (2015). Effects of feed moisture and extruder screw speed and temperature on physical characteristics and antioxidant activity of extruded proso millet (*Panicum miliaceum*) flour. Int. J. Food Sci. and Tech. 51:114-122.

The generous support of the Nebraska Wheat Board is gratefully acknowledged.

Title: Evaluation of feed wheat as a substitute for corn in diets containing distillers grains.

Type of Project: Research

New or Renewal: NEW

Total Amount Requested: $50,695

Project Duration: 12 months from July 1, 2018 to June 30, 2019. The cattle feeding portion will be approximately October, 2018 to May, 2019

Project Coordinator
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Project Abstract

We are proposing a cattle finishing experiment to reassess the value of wheat grain feeding and full or partial replacement of corn grain for feedyard cattle. Six diets will be fed to 36 pens of cattle (6 pens of 12 steers/pen or a total of 432 steers) to statistically compare feedyard performance (intake, gain, and feed utilization) and carcass characteristics. Methods proposed are commonly used to compare energy values of dietary ingredients. This study will be performed at the University of Nebraska-Lincoln Panhandle Research and Extension Center research feedlot near Scottsbluff. Diets will contain two inclusions of distillers grains plus solubles and then either straight corn, straight wheat, or a 50:50 blend of the two grains. The results of this experiment will improve the opportunity to use wheat in Nebraska's feedyard industry and presumably increase demand.

Project Outcome

Nebraska has the largest cattle feeding sector in the U.S. Along with Texas and Kansas, approximately 55 to 60% of feedyard cattle are finished in these 3 states. Feeding wheat as dry-rolled grain is not a new concept. Feeding wheat does create some challenges as the starch is rapidly digested in the rumen and can lead to health challenges such as acidosis. Many producers that feed wheat do so during parts of the calendar year, and as a portion of the grain mix. All of the previous research in this area was conducted prior to use of distillers grains, which essentially all cattle are fed today at some inclusion. Inclusion of

distillers grains can vary from 0 to 40% but the most common inclusions are between 20 and 30%. However, given the prices and advantages, all Nebraska feedyards should be feeding at least 12% and probably less than 40%. Therefore, we are proposing to compare feeding wheat to corn as either the sole grain source or as a 50:50 blend in diets containing either 12% (minimum common inclusion) or 35%. Feeding 35% distillers grains helps eliminate some of the concerns of grain feeding and potential for ruminal acidosis. Our expectation is that in diets with more distillers grains, feeding wheat will be more advantageous than corn. Each year, a portion of the wheat crop is destined to become cattle feed due to nutrient composition and protein content. Establishing a value in today's diets will presumably increase demand for feeding at least a portion of the grain as wheat in Western Nebraska.

Method or Approach

All steers will be received as weaned calves at the University of Nebraska-Lincoln Panhandle Research and Extension Center near Scottsbluff, NE in fall, 2018. Calves will be received for 3 to 4 weeks prior to the experiment to ensure all calves are healthy. Animal handling and space for this experiment are in accordance to the Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching (FASS, First Revised Edition, January 1999). All procedures outlined as part of this study are approved by the University of Nebraska IACUC.

Design and Allotment

Steers will be limit-fed at an estimated 2% of BW for 5 days prior to weighing. Weights will be collected on individuals two consecutive days to minimize gut fill effects and get an accurate initial body weight. This study will utilize 432 steers (12 steers/pen). Steers will be assigned randomly to pens based on the first day weight. Blocking criteria may be used depending on range in body weight. Pens will be assigned randomly to one of 6 treatments described below. This study will be designed as a completely randomized design (or randomized block design if blocking criteria are required) with 6 treatments arranged as a 2 × 3 factorial arrangement of treatments. Pen is the experimental unit, and there will be 6 replications per simple effect treatment, or a total of 36 pens with 6 treatments.

Diets and Feeding

Treatment diet composition is described Table 1. The treatment structure is organized as a 2 × 3 factorial with factors of three ratios of wheat to corn (100:0, 50:50, or 0:100) in diets with either 12 or 35% wet distillers grains plus solubles. A 5% inclusion of supplement will be fed with the primary components as calcium, urea for rumen degradable protein (for 12% distillers treatment), trace mineral premix, vitamin ADE premix, and Rumensin/Tylan at targeted levels. Steers will be fed once daily and diets mixed using Roto-mix feed trucks.

Table 1. Diets fed to finishing steer calves to compare wheat to corn grain feeding in diets with two inclusions of distillers grains.

	12% WDGS			35% WDGS		
Ingredient	100:0	50:50	0:100	100:0	50:50	0:100
Dry-rolled corn	68	34	0	45	22.5	0
Dry-rolled wheat	0	34	68	0	22.5	45
WDGS [1]	12	12	12	35	35	35
Corn silage	15	15	15	15	15	15
Supplement [2]	5	5	5	5	5	5

[1] WDGS = wet distillers grains plus solubles fed at 2 inclusions

[2] Supplements will provide minerals, vitamins, and feed additives to ensure performance is optimized.

Measurements
Cattle will be weighed two consecutive days at the beginning of the trial to establish initial body weight. Steers will be implanted with conventional implant program for their size and duration of feeding. Steers are expected to be fed approximately 160 to 180 days. Performance traits will include dry matter intake, average daily gain (using limit-fed initial weight and carcass-adjusted final weight), body weight measurements including live final body weight, and carcass traits. Carcass traits that are important for collection on the day of slaughter are hot carcass weight, liver scores for abscesses, and kill order. Following a 48 hour chill, fat thickness, longissimus muscle (LM) area, marbling score, and called yield grade will be measured. Assuming a 2% kidney, pelvic, heart (KPH) fat, a calculated yield grade measure will be determined as well. Any cattle observed to have symptoms of common ailments or disorders would be treated according to Standard Operating Procedures established for the University of Nebraska (see Animal Health SOP). Our consulting veterinarian will be consulted for observed conditions that are not covered under the Animal Health Care Standard Operating Procedures. Observations of animal health will be summarized in the final report.

Relevance

Each year, a portion of the wheat crop is likely to be fed to livestock due to protein content. In certain locations in Nebraska, feeding wheat is economical due to price relative to corn. One way to increase wheat demand, and thus production and acres, is to improve the value as a cattle feed. Historically, there is some reluctance to feed too much wheat or to include due to acidosis concerns. Those data are all based on quite old information in diets that are not as relevant today. This experiment will establish whether more wheat can be fed in diets with distillers grains or not.

Impact

The results of the trial will be published in the Nebraska Beef Report. The results will be published in a peer-reviewed journal in future years. These data will be discussed and presented at three places targeting consultants and beef producers (Feedlot Roundtables, Husker Nutrition Conference, and Plains Nutrition Council Spring Conference). In addition, numerous printed extension materials and social media outlets are available for dissemination. The primary audience is cattle feeders that will purchase grains or raise grain in their own operation. The impact will be if feeding wheat has a greater value in diets when more distillers grains are fed to control acidosis. This will allow a value calculation to determine when wheat should replace a portion of corn grain.

Method Suitability

The best way to establish energy value of any feed is to use cattle performance. The most common way is to compare any energy source to corn grain given the knowledge and familiarity with corn as a feed for finishing cattle. The methodology and approach proposed is commonly used in our cattle experiments. I conduct at least 12 large cattle feeding experiments annually to address common questions and problems in the feedyard industry. We do not envision any challenges with methodology or approach. I always joke that cattle can not lie so performance will be our best measure. This is especially true when trying to study the impact of a rapidly fermented grain and potential for ruminal acidosis in cattle. Predicting the impact on ruminal acidosis is impossible except in live cattle. A rumen metabolism study would be very useful to complement the cattle feeding experiment; however, due to budgetary limitations, this proposal focuses on the most important aspect first.

For Administrative Use *Effective Dates*	***PROPOSAL BUDGET***

PRINCIPAL INVESTIGATOR(S): Galen Erickson & Robbi Pritchard

PROJECT TITLE: Evaluation of feed wheat as a substitute for corn in diets containing distillers grains

PROPOSED BUDGET SUMMARY *See Narrative Below*	*FUNDS REQUESTED FOR* *FY* ***Year 1***	*FY* ***Year 2***
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*		
1. Senior Associates		
2. Research Associates – Post doctorate		
3. Other Professionals		
4. Prebaccalaureate Students		
5. Secretarial – Clerical		
6. Technical, Shop, Other	*$12,133*	
7. Graduate Students	*$19,200*	
B. FRINGE BENEFITS		
1. Faculty & Staff @ 30%, 40% or 50%	*$6,067*	
2. Grad Student @ 38% plus Health Ins.	*$9,320*	
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)		
D. TRAVEL — *Domestic*	*$1,275*	
D. TRAVEL — *Foreign*		
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)	*$2,700*	
F. TOTAL AMOUNT OF THIS REQUEST	*$50,695*	

INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.

Budget Narrative

A. Salaries and Wages: Requesting 4 months of technician salary at PHREC (salary of $36,400). Requesting 1 M.S. student with stipend of $19,200.
B. Fringe Benefits: Fringe benefit rate for the technician is 50%. Graduate student health insurance is estimated at $2,024 and fringe benefits of 38% for tuition remission.
C. Equipment: No equipment purchased
D. Travel: 3 trips of 820 round-trip miles from Lincoln to Scottsbluff estimated at $0.25/mile is requested. Two hotel rooms ($110/night) for the 3 trips is estimated at $660.
E. Other direct costs: Feed analysis in the laboratory is estimated for $1,800 at $50/sample for 6 samples across 6 monthly composites and publication charges are estimated at $900.
F. Total amount of request is $50,695

Name of the check-off board to which proposal will be submitted: Nebraska Wheat Board

Project Title: Out of State Variety Testing of University of Nebraska Winter Triticale Varieties (Released and Experimental).

Project Year/Time Period: July 2018-June 2019
This is a research project primarily, but will also affect domestic marketing.
This is a renewal project.
Amount Requested: $42,000
Project Duration: July 1, 2018 to June 30, 2019.

Principal Investigators:
Jeff Noel, Husker Genetics, Agricultural Research Division; 402-540-9359; jnoel2@unl.edu , (coordinator)
P. Stephen Baenziger, Department of Agronomy and Horticulture; 402-472-1538;
pbaenziger1@unl.edu

Organization: Husker Genetics/Nebraska Foundation Seed Division, 1071 County Road G, Ithaca, NE 68033,

Body of Proposal:

Abstract:
Dr. Baenziger's winter triticale variety breeding programs develop varieties that are commercially adapted to other states. These states include New York, Illinois, Wisconsin, Washington, Idaho, Oregon, Arizona, New Mexico and Texas. Relevant performance data supports the commercialization of these lines that generate license fees that return to the University and to the Nebraska Wheat Board to support future line development and small grains research.

Project Outcomes:
To effectively commercialize triticale varieties in their adaptive production region to maximize return to the investment in their development. This proposal is submitted to help meet the costs of out of state testing. License fees generated from out of state agreements and sales hopefully will more than cover the expense of testing. Recently to support our in state variety testing, our testing program has charged for testing all entries from public and private breeding programs. Hence our lines that are tested out of state now pay their state testing fees. Our lines have regional and in some cases national impact, but they must be tested in other states to document that impact.

Method or Approach:
Commercial varieties and potential commercial varieties will be submitted to relevant testing services and tested in replicated variety trials. Data will be shared with potential licensees and growers.

Timeline and milestones for research:
After harvest lines with promised will be advanced and selected for testing in other states. As more data is collected from other state trials, we expect to develop adaptation profiles for better targeting. Seed will be shipped by the end of August for planting. Data will be returned in July and a marketing strategy will be developed based upon the data. This is a new project that is critical to providing useful data to Husker Genetics and the seed industry.

Project locations:

New York, Washington, New Mexico, Arizona and Virginia which represent the major areas of forage production.

Technology transfer:
Development of sales for Certified Seed Growers and Generation of License Fees from business entities in New York, Washington, New Mexico, Arizona and Virginia.

Relevance: The U.S. wheat grower is looking for alternative crops to augment their rotations and farm needs. Triticale is an emerging crop that has use as a feed grain, annual forage, and cover crop.

Imapct:
Triticale and specifically those developed at the University of Nebraska have the potential to have a national impact on this emerging crop as we are developing some of the more witnerhardiness and rainfed adapted triticales in the U.S. Note there are few competitors, so this is a potentially national market.

Method Suitability:
The only way to convince growers and seed producers of the value of a line is through testing in their region. This proposal is to provide for that required testing.

Summary of Accomplishments:
NT07403 and NT09423 were released. Both lines were licensed in 2016; NT07403 in Nebraska and NT09423 in New York for the Northeast. NT12414 and NT12434, are licensed to a large seed company. NT11406 and NT11428 were released and licensed in 2016. Our release protocol is to have lines released once we have found a commercial partner. We expect the revenue from royalties will begin in 2017 and increase thereafter.

For Administrative Use Effective Dates	**PROPOSAL BUDGET**

PRINCIPAL INVESTIGATOR(S): Jeff Noel, Chad Lanik and Steve Baenziger
PROJECT TITLE: Out of State Variety Testing of University of Nebraska Winter Triticale Varieties (Released and Experimental).

PROPOSED BUDGET SUMMARY *See Narrative Below*		FUNDS REQUESTED FOR FY **Year 1**	FY **Year 2**
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals – Lincoln tech support			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%			
2. Grad Student @ 41% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)			
D. TRAVEL	Domestic	12,000	12,000
	Foreign		
E. ALL OTHER DIRECT COSTS – Test Plot Fees 6 locations X 6 Varieties X $5,000			
		30,000	30,000
F. TOTAL AMOUNT OF THIS REQUEST		42,000	42,000

INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.

BUDGET NARRATIVE:

A. Salaries & Wages $0.0

B. Fringe Benefits $0.0
C. Non-expendable Capital Equipment $0.0
D. Travel $12,000
    a. Travel to sites Mileage, airfare, lodging, meals
E. All Other Direct Costs $30,000
        i. Test Plot Fees 6 locations X 6 Varieties X $5,000

Name of the check-off board to which proposal will be submitted: Nebraska Wheat Board

Project Title: Out of State Variety Testing of University of Nebraska Winter Wheat Varieties (Released and Experimental).

Project Year/Time Period: July 2018-June 2019
This is a new/ongoing project.

Principal Investigators:
P.S. Baenziger (coordinator) 362D Plant Science Building, University of Nebraska, Lincoln, NE 68583-0915, Phone: (402) -472-1538, Fax: (402)-472-7904, pbaenziger1@unl.edu;Jeff Noel, Husker Genetics, Agricultural Research Division; 402-540-9359; jnoel2@unl.edu

Organization: Husker Genetics/Nebraska Foundation Seed Division, 1071 County Road G, Ithaca, NE 68033

Body of Proposal:

Abrstract:
Dr. Baenziger's winter wheat variety breeding programs develop varieties that are commercially adapted to other states. These states include Colorado, Kansas, Wyoming, South Dakota, North Dakota, Minnesota, Texas and Oklahoma. Relevant performance data supports the commercialization of these lines that generate license fees that return to the University and to the Nebraska Wheat Board to support future line development and small grains research.

Project Outcomes:
This proposal is submitted to help meet the costs of out of state testing. License fees generated from out of state agreements and sales hopefully will more than cover the expense of testing. Recently to support our in state variety testing, our testing program has charged for testing all entries from public and private breeding programs. Hence our lines that are tested out of state now pay their state testing fees. Our lines have regional impact, but they must be tested in other states to document that impact.

Method or Approach:
Released cultivars and elite lines that have been tested in regional nurseries and that have merit will be advanced and based upon their areas of adaptation will be tested in appropriate replicated state variety trials. In most cases, three released lines and potentially three experimental lines will be tested in trials in other states. The lines will differ in the various state trials based upon perceived adaptation. Our goal it to effectively commercialize wheat varieties in their adaptive production region to maximize return to the investment in their development
Timeline and milestones for research: This is a new/ongoing project that is critical to providing useful data to Husker Genetics and the seed industry.
Project locations: Colorado, Kansas, Wyoming, and South Dakota

Relevance: The Nebraska Wheat board has a long standing interest in allowing other states to use the varieties that helped support in their development.

Potential Impact:
Development of sales for Nebraska Certified Seed Growers and Generation of License Fees from business entities in the Great Plains.

For Administrative Use Effective Dates	**PROPOSAL BUDGET**

PRINCIPAL INVESTIGATOR(S): Jeff Noel, Chad Lanik and Steve Baenziger
PROJECT TITLE: Out of State Variety Testing of University of Nebraska Winter Wheat Varieties (Released and Experimental).

PROPOSED BUDGET SUMMARY *See Narrative Below*		FUNDS REQUESTED FOR FY **Year 1**	FY **Year 2**
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals – Lincoln tech support			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%			
2. Grad Student @ 41% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)			
D. TRAVEL	Domestic		
	Foreign		
E. ALL OTHER DIRECT COSTS – Entry Fees from Testing States			
		15,000	15,000
F. TOTAL AMOUNT OF THIS REQUEST		15,000	15,000

INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.

BUDGET NARRATIVE:

A. Salaries & Wages $0.0
B. Fringe Benefits $0.0
C. Non-expendable Capital Equipment $0.0
D. Travel $0.0
E. All Other Direct Costs $15,000
    a. Entry Fees from Testing States

Name of the check-off board to which proposal will be submitted: Nebraska Wheat Board

Project Title: Yuma Seed Increase for University of Nebraska Winter Triticale Varieties (Released and Experimental).

Project Year/Time Period: July 2018-June 2019
This is a research project primarily, but will also affect domestic marketing.
This is a renewal project.
Amount Requested: $62,300
Project Duration: July 1, 2018 to June 30, 2019.

Principal Investigators:
Jeff Noel, Husker Genetics, Agricultural Research Division; 402-540-9359; jnoel2@unl.edu , (coordinator)
P. Stephen Baenziger, Department of Agronomy and Horticulture; 402-472-1538;
pbaenziger1@unl.edu

Organization: Husker Genetics/Nebraska Foundation Seed Division, 1071 County Road G, Ithaca, NE 68033, 402-624-8083

Body of Proposal:
Abstract:
After multi-year evaluation of potential lines for release, the top lines are sent to Yuma for breeder seed increases.

Project Outcomes:
The quality and quantity of seed produced in Yuma cannot be matched in Nebraska. The target market for triticale is the grazing, hay forage market. The University of Nebraska is one of three major breeding programs (the others being Syngenta and Texas A&M) and we have the highest level of winterhardiness. Hence there is a potential for a national marketing capability. This project is to support Breeder seed increases to quickly reach the market with high quality seed production. **Simply,** the increase of breeder seed will allow for the commercialization of new cultivars faster

Timeline and milestones for research:
After harvest and data analysis, the best performing lines will be sent to Yuma, AZ for seed increase. The seed will be returned in early June 2017 which will allow for it to be cleaned before the main wheat harvest and seed cleaning occurs in Nebraska.

Project locations:
Yuma, Arizona

Technology transfer:
Development of sales for Certified Seed Growers and Generation of License Fees from business entities

Relevance:
The U.S. wheat grower is looking for alternative crops to augment their rotations and farm needs. Triticale is an emerging crop that has use as a feed grain, annual forage, and cover crop.
Having sufficient seed is the most critical issue for getting to market the new genetics.

Imapct:
Triticale and specifically those developed at the University of Nebraska have the potential to have a national impact on this emerging crop as we are developing some of the more witnerhardiness

and rainfed adapted triticales in the U.S. Note there are few competitors, so this is a potentially national market. This proposal will allow us to get to market at least one year earlier than using increases in Nebraska.

Method Suitability:
The only way to market triticale to growers and seed producers is to have breeder and foundation seed available. This is the most efficient way of producing large quantities of see from small lots.

For Administrative Use Effective Dates		**PROPOSAL BUDGET**	
PRINCIPAL INVESTIGATOR(S): Jeff Noel, Chad Lanik and Steve Baenziger PROJECT TITLE: Yuma Seed Increase for University of Nebraska Winter Triticale Varieties (Released and Experimental).			
PROPOSED BUDGET SUMMARY *See Narrative Below*		FUNDS REQUESTED FOR FY	FY
		Year 1	**Year 2**
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals – Lincoln tech support			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%			
2. Grad Student @ 41% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)			
D. TRAVEL	Domestic	2,300	2,300
	Foreign		
E. ALL OTHER DIRECT COSTS – Production, Harvest and Transportation Fees 20 acres X $3,000 per acre			
		60,000	60,000
F. TOTAL AMOUNT OF THIS REQUEST		62,300	62,300
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.			

BUDGET NARRATIVE:

A.	Salaries & Wages	$0.0
B.	Fringe Benefits	$0.0
C.	Non-expendable Capital Equipment	$0.0
D.	Travel Travel to sites mileage, airfare, lodging, and meals	$2,300.0
E.	All Other Direct Costs Production, Harvest, and Transportation fees 20 acres @ $3,000 per acre	$60,000.0

Name of the check-off board to which proposal will be submitted: Nebraska Wheat Board

Project Title: Yuma Seed Increase for University of Nebraska Winter Wheat Varieties (Released and Experimental).

Project Year/Time Period: July 2018-June 2019
This is a research project primarily, but will also affect domestic marketing.
This is a renewal project.
Amount Requested: $31,150
Project Duration: July 1, 2018 to June 30, 2019.

Principal Investigators:
Jeff Noel, Husker Genetics, Agricultural Research Division; 402-540-9359; jnoel2@unl.edu , (coordinator)
P. Stephen Baenziger, Department of Agronomy and Horticulture; 402-472-1538;
pbaenziger1@unl.edu

Organization: Husker Genetics/Nebraska Foundation Seed Division, 1071 County Road G, Ithaca, NE 68033

Body of Proposal:
Abstract:
After multi-year evaluation of potential lines for release, the top winter wheat lines are sent to Yuma for breeder seed increases to rapidly advance our commercialization potential.

Project Outcomes:
The quality and quantity of seed produced in Yuma cannot be matched in Nebraska. It saves us a year to use this facility. It will also provide better lines sooner to the Nebraska wheat producer. In a competitive world, the quicker we can get better lines to growers, the more productive our producers will be.

Method or Approach:
Breeder seed will be sent to Yuma where the lines will be increased under contract. Approximately 50 pounds of seed will be shipped to Westerag of Yuma, AZ for increase. The seed will be shipped by October 15 for planting in early Novermber. The fields will be inspected in April/May for quality control and the grain will be returned in early June. Normal increase is 100 fold. So 50 lbs of breeder seed will produce 5,000 or more of grain. This amount of seed is sufficient to plant a large increase at Ithaca, NE or in collaboration with commercial seed producers the the final increase before selling the seed to certified seed producers and then to growers.
Timeline and milestones for research: Please see above, but it is expected that at least one experimental line will be released will be released from each increase cycle.
Project locations: Yuma, Arizona

Relevance: New wheat varieties are one of the most tangible aspects of a successful research program. To improve wheat production for growers.

Impact: The increased lines will be released to Certified Seed Growers. It is expected that there will also be the Generation of License Fees from business entities which will be shared with the Nebraska Wheat Board.

Method Suitability: The only way to market wheat varieties to growers and seed producers is to have breeder and foundation seed available. This is the most efficient way of producing large quantities of seed from small lots.

For Administrative Use Effective Dates		**PROPOSAL BUDGET**	
PRINCIPAL INVESTIGATOR(S): Jeff Noel, Chad Lanik and Steve Baenziger PROJECT TITLE: Yuma Seed Increase for University of Nebraska Winter Wheat Varieties (Released and Experimental).			
PROPOSED BUDGET SUMMARY *See Narrative Below*		FUNDS REQUESTED FOR FY	FY
		Year 1	**Year 2**
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals – Lincoln tech support			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%			
2. Grad Student @ 41% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)			
D. TRAVEL	Domestic	1,150	1,150
	Foreign		
E. ALL OTHER DIRECT COSTS – Production, Harvest and Transportation Fees 10 acres X $3,000 per acre			
		30,000	30,000
F. TOTAL AMOUNT OF THIS REQUEST		31,150	31,150
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.			

BUDGET NARRATIVE:

A. Salaries & Wages $0.0

B. Fringe Benefits $0.0
C. Non-expendable Capital Equipment $0.0
D. Travel $1,150
    a. Travel to sites airfare, mileage, lodging and meals
E. All Other Direct Costs $30,000
    a. Production, Harvest, and transportation costs 10 acres @ $3,000 per acre

RESEARCH PROJECT PROPOSAL

Submitted to: Nebraska Wheat Board (NWB), Lincoln, Nebraska

Title of Project: Developing High Quality Nebraska Wheat for Domestic and International Markets

Type of Project: Research

New or Renewal: Renewal

Total Amount Requested: $50,000.00

Project Duration: July 1, 2018 to June 30, 2019 (48th year)

Principal Investigators:

PI: Lan Xu, Department of Agronomy and Horticulture, 177 Keim Hall, University of Nebraska-Lincoln, Phone 402-472-6243, Fax 402-472-7904, lxu4@unl,edu

Co-PI: Devin Rose, Department of Food Science & Technology, FIC 1901 N 21st St Rm 268, University of Nebraska-Lincoln, Phone 402-472-2802, Fax 402-472-7902, drose3@unl.edu.

Co-PI: P. Stephen Baenziger, Department of Agronomy and Horticulture, 362D Plant Science Hall, University of Nebraska-Lincoln, Phone 402-472-1538, Fax 402-472-7904, pbaenziger1@unl.edu

Organization: Department of Agronomy and Horticulture, 279 Plant Science Hall, University of Nebraska-Lincoln (UNL), Phone 402-472-6243, Fax 402-472-7904, lxu4@unl.edu

Project Abstract:

Nebraska wheats have a long-standing reputation for superior quality in the milling and baking industries. In addition, there is an emerging market for high quality tortilla and noodle as well whole wheat bread from Nebraska wheat. Identification of superior quality characteristics is essential to keep Nebraska wheat competitive. Wheat Quality Laboratory at UNL plays an important role in this process through end-use quality evaluation of early to later generation wheat from UNL wheat breeding program (WBP) and other sources. Analyses include kernel variability, sprouting damage, milling performance, ash, protein and dietary fiber contents, polyphenol oxidase activity, starch viscosity, protein and carbohydrate compositions, dough rheology, and final product quality such as bread, noodle and tortilla. Our results are used by the WBP for wheat advancement to release varieties with excellent end-use quality. Furthermore, with new genomic tools available these data may be used for prediction of wheat quality throughout the WBP.

Project Outcomes:

In the last fiscal year, we evaluated about eight hundred samples from nine projects for wheat end-use quality in Wheat Quality Lab (WQL) of UNL, which was created in 1959 from NWB funds. We studied milling and bread-making properties of conventional wheat nurseries such as S4R8, NIN, Duplicate/Triplicate, IRDR, and WQC. In addition, we examined noodle, tortilla and whole wheat bread production performances for selected wheat varieties, which are emerging markets. Almost all wheat lines had low kernel variability and good milling performance. Most wheat flour samples had high protein and low ash contents. Therefore, most wheat flour samples had good bread-, noodle-, and tortilla-making quality. Different planting treatments affected wheat end-use quality. We registered NE05548 in the last

fiscal year in Journal of Plant Registration. We continue to promote high quality Nebraska wheat for domestic and international markets.

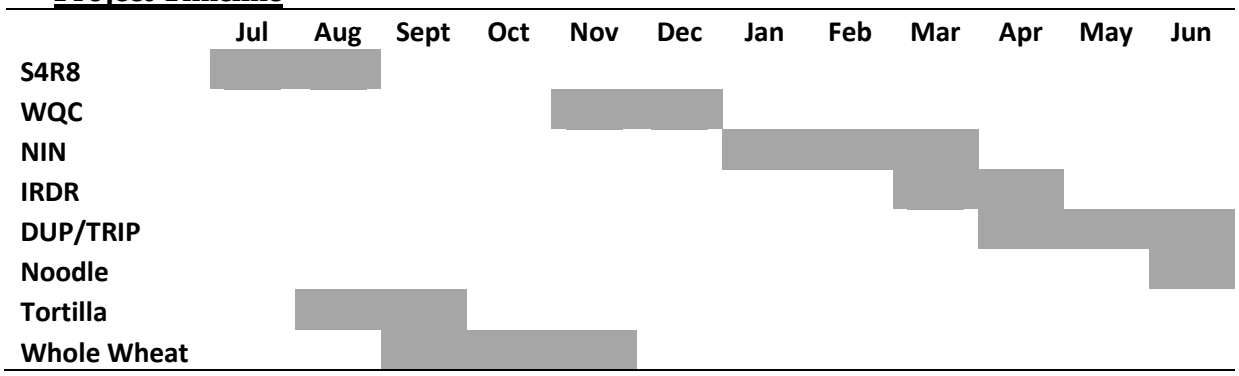
Method or Approach:

The American Association of Cereal Chemists (AACC) Intentional standard methods and specialized methods from primary literature are used. The experiments are performed using various equipment and instruments available in the lab, including a Single Kernel Characterization System (SKCS, Perten) for kernel characteristics; Falling number device (Perten) for sprouting damage evaluation; UDY cyclone, Quadramat Jr., and Buhler mills for small- and large-scale milling; Near-infrared spectrometer (NIR, Foss) and nitrogen/protein analyzer (LECO) for protein value; Muffle furnace (Thermolyne) for ash content; Rapid Visco Analyzer (RVA, Newport Scientific) for flour viscosity; Mixograph (National MFG) for dough rheology; Dough mixer, sheeter, fermentation/proofing cabinet, and oven for bread-making (National MFG); a dough press and griddle (Dough Xpress) for tortilla production; texture analytical instrument (Texture Technologies Corp.) for bread, noodle and tortilla texture analysis; C-Cell image instrument (Perten) for bread and tortilla image evaluation; UV/Vis spectrophotometer (Beckman) for polyphenol oxidase (PPO) and other enzyme activity analysis; High Performance Liquid Chromatograph (HPLC) (Agilent Technologies) and Gas Chromatograph (PerkinElmer, Waltham, MA) for protein and carbohydrate compositional assays.

Objectives

1. Identify and eliminate early-generation experimental wheat lines with inferior quality traits such as low protein or weak dough rheology.
2. Identify advanced generation red and white winter wheat lines with low kernel variability, superior milling and end-use quality.
3. Perform basic and applied research into quality issues that affect the marketability and genetic improvement of Nebraska wheat.
4. Investigate how cultural/management practices (e.g. irrigation, fertility, disease and insect control, organic) affect end-use quality.
5. Investigate and evaluate new techniques to analyze samples from the Nebraska wheat breeding to improve efficiency.

Project Timeline



Relevance:

In 2018-2019 fiscal year, the investigators plan to continue testing Nebraska wheat varieties to ensure sustainable high-quality wheat products. With the growing concern for healthy food products and interest in whole grain foods, the investigators also plan on developing and implementing better methods for evaluating whole wheat bread making properties. This will be accomplished through validation of whole wheat milling performance, dough rheological properties, and bread baking formula and technique. The

important analyses performed by the WQL in UNL require labors, materials, regents, and chemicals, while the equipment and instruments require maintenance for proper function. Support from NWB is essential and gratefully acknowledged for keeping operation of this lab.

Impact:

This proposed research would continue to offer Nebraska wheat growers with superior quality hard wheat varieties and ideal management practices for production from now and in the future. The Nebraska wheat industry will supply superior wheat to sell into domestic and international marketplaces.

Method Suitability:

The release of improved hard red and white winter wheat varieties with superior quality attributes will be the purpose of this research. We will provide data to the NWB, Nebraska Crop Improvement Association (NCIA), and commercial millers and bakers for excellent end-use quality varieties, and to growers for recommended cultural and management practices. The milling and baking industries will continue to recognize Nebraska wheat for its superior functionality for their processing needs. Research results will be incorporated into extension and scientific presentations and publications. Periodic reports will be presented to the NWB.

Project Budget:

For Administrative Use Effective Dates: 07/01/2018 to 06/30/2019	**PROPOSAL BUDGET**	
PRINCIPAL INVESTIGATOR(S): Lan Xu, Devin Rose, P. Stephen Baenziger PROJECT TITLE: Developing High Quality Nebraska Wheat for Domestic and International Markets		
PROPOSED BUDGET SUMMARY *See Narrative Below*	FUNDS REQUESTED FOR FY 2018 FY 2019	
	Year 1	**Year 2**
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*		
1. Senior Associates		
2. Research Associates – Post doctorate		
3. Other Professionals	30150	
4. Prebaccalaureate Students		
5. Secretarial – Clerical		
6. Technical, Shop, Other		
7. Graduate Students		
B. FRINGE BENEFITS		
1. Faculty & Staff @ 30%	9045	
2. Grad Student @ 38% plus Health Ins.		
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)		

D. TRAVEL	Domestic	800	
	Foreign	2700	
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		7305	
F. TOTAL AMOUNT OF THIS REQUEST		50000	
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.			

Budget Justification

A. ***Salaries and Wages:*** Other Professionals - One full-time technician is hired for wheat quality tests ($15.0/hr);
B. ***Fringe Benefits:*** Staff @ 30% of salary.
C. ***Non-expendable Capital Equipment:*** none
D. ***Travel:*** Domestic for 2019 Wheat Quality Council meeting in MO; Foreign for 2018 AACC International conference in UK.
E. ***All other Direct Costs:*** Wheat quality tests require supplies, chemicals, and consumable parts of instrument and equipment ($2305). $5000 for Buhler mill and baking equipment, and other instruments calibrations and maintenances expense used more than 2 years.

Appendix: Summary of Accomplishments for Last Fiscal Year

In 2016-2017 fiscal year, nine projects and total about 800 red and white hard winter wheat (HWW) samples were studied for their wheat end-use quality in kernel characteristics, protein and ash contents, soluble and insoluble dietary fiber (SDF and IDF) amounts, PPO activity, dough rheology, milling performance, bread-, noodle-, and tortilla- making properties. The major projects are summarized below.

In 500 HWW lines from the 2016 S4R8 early generation wheat, the flour yields were low (56.9±4.6%) with fair bran cleaning rates (3.4±0.5 in 1-5 scale). The protein contents were 15.8±1.0% and 12.5±0.7% for whole wheat (WW) at 12% mb and white flour (WF) at 14% mb, respectively, which both were very high. The water absorptions (abs) of WF were high (62.3±1.2% at 14% mb). The dough maximum strengths were strong (48.2±5.1 %TQ). The dough extensibility at max strength were normal (4.1±1.1 min). The dough mixing resistances or tolerances were good (122.8±33.6 %TQ·min or 3.8±1.0). Therefore, most samples had good protein content and dough rheology. Only about 15% samples were rejected to be advanced next generation nursery due to poor dough rheological properties.

In 57 HWW lines from the 2016 NIN nursery, the kernel hardness, size and weight were large (63.7±7.4, 2.6±0.1 mm and 30.9±2.1 mg) with high variability. The yields of WF were high (70.8±1.4%) with good milling performance. The ash amounts were low (0.39±0.07%). Both WW and WF protein contents were high (12.8±1.0% in WW and 11.3±0.7% in WF). The water abs of WF were also high (62.7±1.3%). The dough extensibility was very long (6.3±2.0 min), and strengths were slightly weak (43.4±2.6 %TQ), but mixing resistances (105±13 %TQ·min) or tolerances (3.9±0.7) were good. The mixing times were also very long (6.9±2.0 min). The loaf volumes and specific volumes were high (898±56 cc and 6.4±0.4 cc/g). Most samples had good bread crumb structure and texture. All samples including checks got fair to good bread quality.

In 60 HWW lines from the 2016 Triplicate nursery, the kernel hardness, size and weight were large (61.5±10.8, 2.7±0.1 mm and 32.4±2.4 mg), respectively. The kernels were diverse in weight. The yields of WF were high (70.5±1.3%), with good milling performance. The ash amounts were low (0.38±0.04%). Both WW and WF protein contents were high (12.7±0.8% in WW and 10.9±0.7% in WF). The water abs of WF were also high (62.0±1.3%). The dough extensibility was long (6.1±1.7 min), strengths were slightly weak (41.8±2.7 %TQ), and mixing resistances or tolerances were normal (96.5±14.7 %TQ·min or 3.5±0.8). The mixing times were also long (6.7±1.7 min). The loaf volumes and specific volumes were high (876±47 cc and 6.2±0.6 cc/g). Most samples had good breadcrumb structure and texture. Almost all samples including checks had fair to good than fair bread quality.

In 22 HWW lines from the 2016 IRDR nursery, the kernel hardness was small (55.1±10.4). The size and weight were large (2.7±0.1 mm and 33.0±2.5 mg). The kernels were diverse in hardness and weight. The yields of WF were high (70.6±2.2%) with good milling performance. The ash values were low (0.39±0.04%), Both WW and WF protein contents were normal (12.5±0.5% in WW and 10.6±0.6% in WF). The water abs were also typical (61.2±0.9%). The dough extensibility was long (6.0±1.7 min), dough strengths were slight weak (42.5±3.0 %TQ) and mixing resistances or tolerances were fair (99±18 %TQ·min and 3.4±1.0). The mixing times were also long (6.4±1.5 min). The loaf volumes and specific volumes were high (889±49 cc and 6.6±0.3 cc/g). Most samples had good bread crumb structure and texture. All samples including checks got fair to good bread quality.

27 HWW lines from seven breeders were evaluated for bread-making properties by different collaborators in WQC. As compared with other collaborators' bread-making results, our results were close to average with similar trends. NE wheat got medium good quality in bread-making among these breeders. In addition, the bread-making quality of LCH13NEDH-4-16 was better than that of LCH13NEDH-14-53 and was less than that of Jagalene (check).

24 samples from the 2016 hard white winter wheat were analyzed for noodle quality. The ash contents of WF were low (0.39±0.03%). The protein contents of WF were normal (11.2±1.0 %). The water abs were high (62.6±1.6%). The dough extensibilities were good (5.8±1.6 min), strengths were strong (50.1±10.2 %TQ) and mixing resistances or tolerances were good (100±12 %TQ.min or 3.7±0.6). The PPO activity was 0.84±0.28 A/g. PPO causes noodle to change color. After 24 hours storage, the noodles became slightly less white, and more reddish and yellow. The noodle shearing strengths were good (1.3±0.4 N). Most samples including the check had good noodle quality.

30 samples with a range of protein contents were selected from 2015 HWW in order to analyze for tortilla quality. The WF protein contents were 13.0±1.7%. The WF protein contents of control were 11.3±0.2%. Compared with the control, most samples had higher water abs (66.7±3.2%), lower dough extensibility (4.5±1.1 min), and larger dough strength (49.7±6.0 %TQ) and mixing resistances (111±19 %TQ·min). Overall fresh tortillas of samples had equal to or less quality than that of the control in terms of dough making and pressing, tortilla size and strength as well resilience. After storage for one week, a few tortillas from samples were less resilient for rolling than that of control.

52 with a range of protein contents from 2015 HWW samples were selected in to analyze for whole wheat bread making properties. As compared with the control, most samples had higher ash (1.81±0.09%) and protein (14.7±1.5%) as well as dietary fiber (3.3±2.5% in SDF and 9.9±2.2% in IDF) contents. Most samples had higher water abs (71.5±2.8%), lower dough extensibility (4.8±1.2 min) and strengths (44.1±2.3 %TQ) as well as mixing resistances (94.3±13.7 %TQ·min). Most samples had shorter mixing times (6.8±1.5 min), smaller volumes and specific volumes (453±64 cc and 3.0±0.4 cc/g). Most samples had denser and harsher crumb texture. Only 9 samples had comparable bread quality with the control. They were WESLEY, NI10718W, NI14727, NE15614, NW15404, NW15466, NW15564, NW15573, and NW15677.

RESEARCH PROJECT PROPOSAL

Submitted to: Nebraska Wheat Board, Lincoln, Nebraska

Project Title: Improving Winter Wheat Varieties for Nebraska
Type of Project: Research
Renewal:
Total Amount Requested: **$130,000**
Project Duration: July 1, 2018 to June 30, 2019 (48th Year)

Principal Investigators: P.S. Baenziger (coordinator) 362D Plant Science Building, University of Nebraska, Lincoln, NE 68583-0915, Phone: (402) -472-1538, Fax: (402)-472-7904, pbaenziger1@unl.edu; Devin Rose, and Dipak K. Santra

Organization: Department of Agronomy and Horticulture, 202B Keim Hall, University of Nebraska, Lincoln, NE 68583-0915, (402-472-5132, Fax: (402)-472-7904, hsteffens4@unl.edu

Body of Project
Abstract:

Small grains remain a major crop throughout Nebraska, development of new cultivars with improved quality and genetics is important to ensuring Nebraska wheat producers remain competitive. Our objectives are to: 1) strengthen breeding programs with an emphasis on input efficiency, irrigated production, end-use quality, and disease resistance to enhance profitability, and 2) continue research on improving breeding efficiency. Specifically we will continue our efforts in: 1. genomic selection, 2. selecting tall, long coleoptile wheat varieties, 3. developing elite irrigated wheat, 4. identifying high yielding, broadly adapted lines with resistance to disease, insects, and herbicides 5. improving end-use quality and healthier grains. We identify the best germplasm and combine traits by crossing. Lines are selected from segregating populations using field, greenhouse, and laboratory tests, while expanding and diversifying our use of molecular markers. The best lines will be released as new varieties and serve as the basis for future hybrid wheat.

Project Outcomes:

The Nebraska small grains producer is faced with rapid changes, including high costs for fertilizer, energy and energy related inputs, new pests and diseases, old scourges (e.g., drought, wheat streak mosaic virus and new virulent strains of leaf and stem rust), new market opportunities (e.g., white wheat, organic wheat, flex and cover cropping, and specialty tortilla flours), greater demand for healthier grains, structural changes (e.g., changing government programs and regulations), emerging technologies, potential premiums for protein, strong gluten wheat for blending, and reduced carbon footprints. Wheat remains a major crop throughout Nebraska and the crop of choice/necessity in many areas. Barley and triticale are emerging crops. Recently, small grains production area has decreased. The diverse environments of Nebraska require small grains varieties that are tailored to specific production areas and practices to allow growers to choose wheat, triticale, and barley varieties that are adapted to their environments while meeting their customer's needs. Specifically, winter wheat varieties (semi-dwarf and tall) are needed that possess winter hardiness, heat and drought tolerance, responsiveness to irrigation, excellent end-use quality and healthier grains, and disease and insect resistance. Also, future wheat varieties will need to be nitrogen- and water-use efficient (N/WUE) and out-compete weeds or be herbicide-tolerant, thus reducing input costs and environmental damage while improving profitability. In

addition, hybrid wheat may have the tools to develop and become widespread. Improved wheat (and barley and triticale) varieties are one of the most cost-effective ways of fostering Nebraska's wheat (small gains) industry and reputation as a supplier of premium wheat, barley and triticale. Though renewed commercial interest in wheat variety development has occurred, it is critical to create varieties and germplasm specifically adapted to Nebraska and share with our industry partners. Hence, the objectives of this program are to: 1) strengthen our existing red and white breeding programs with an emphasis on input efficiency, irrigated production, healthier grains, and disease, insect, and herbicide resistance, 2) add value to wheat, (end-use quality including niche and trending markets), barley, and triticale, and 3) continue research on improving breeding efficiency. We will continue our efforts in: 1. genomic selection, 2. selecting a new tall, long coleoptile wheat variety to complement or replace Pronghorn and Goodstreak, 3. developing elite irrigated wheat varieties that are WUE, 4. identifying high yielding broadly adapted lines and hybrids with resistance to disease, insects, and herbicides 5. a major effort on improved end-use quality through the use of high throughput NIR grain, and 5. healthier grains through increased Fe and Zn (beneficial nutrients) , and reduced heavy metal (Cd) accumulation. Our breeding efficiency and graduate education will be improved by better mechanization, high throughput phenotyping, and integration of software tools for statistical and molecular marker analyses, specifically related to genomic selection.

Method or Approach: Identify the best available germplasm (regionally, nationally, and globally) for small grains productivity, pest resistance, and quality within our market class by developing mechanisms and exchanging germplasm public and private breeders. Expand our global reach for germplasm through collaborations internationally and with CIMMYT and national breeding programs. For NUE and Cd, we have identified lines with high NUE characteristics and lines with low Cd accumulation, and are using them as parents in our breeding program. Once the needed germplasm is identified, we will combine traits from selected lines using crosses (over 1200 crosses will be made in 2018-6-19) and develop populations having potential for variety release in Nebraska. Emphasis will be on expanding our premium hard red and white winter wheat market franchise. Our successful irrigated wheat breeding continues to increase yield potential and earliness of our lines. Lines will be selected from segregating populations for disease (leaf, stripe, and stem rust, bacterial streak, wheat streak mosaic virus, wheat soilborne mosaic virus, Fusarium head blight=scab), insect (Hessian fly and wheat stem sawfly), and herbicide (Clearfield and Axiom) resistance, performance, and quality using field, greenhouse, and laboratory tests in Nebraska, Kansas, and Minnesota. With each additional trait that we select for, the number of lines having all the traits is reduced, hence the base population and the number of crosses must be increased to accommodate the greater selection intensity. Technology continues to be a key driver of breeding success, so our past and future investment in improved technology. We continue to expand and diversify our use of molecular markers to facilitate bringing in new genes (especially for wheat streak mosaic virus, scab, and pyramided resistances for stem or other rusts) and improve genomic selection. Advanced statistical approaches and selection nurseries (eight locations throughout Nebraska) are an integral part of this program. Over 45,000 experimental lines will be evaluated, and we will advance selected lines for release as new varieties. By incorporating genomics selection (allele replications) and advanced statistical designs that better remove (account for) field variation, we are greatly increasing our estimates of line potential in our major ecogeographic regions. A continuing concern is how to compare lines across nurseries (duplicate to triplicate to NIN to regional trials). We are developing new approaches to make it easier to assure that only the best lines are advanced. Finally, we are expanding our hybrid wheat breeding program (started in 2015 and now funded through NIFA-IWYP) as a way that could revolutionize wheat production and profitability for the producers. In this program we made and evaluated an additional 700 crosses which will be used for variety and inbred parent line development. Though, hybrid wheat will be at least 10 years away, what we can learn about wheat breeding and gene interactions while laying the foundation for the future should have near term impact.

Research locations: The main breeding locations will be at Lincoln, Ithaca, and Sidney NE for rainfed

wheat testing and at Hemingford for irrigated wheat testing with important rainfed selection nurseries at a Clay Center, North Platte, McCook (sponsored by Ardent Mills), Grant and Hemingford, NE. The ability to test at eight locations is due to Wheat Board support and gratefully acknowledged.
Technology Transfer: The products of this research will include new varieties that will be made available by the Foundation Seeds Division and related or niche market lines that may be made available through licensing; new scientists, and new information which will be made available through extension meetings and print or electronic extension publications, and scientific journals. Our goal is to make the program readily available and "transparent" to the public and the small grains industry. The program is dedicated to the public good, the wheat, barley, and triticale industry, and our constituents.
Relevance: The Nebraska Wheat Board is interested in funding research that will adapt to changing production trends to increase producer profitability. This work will lead to more efficient varieties that should enhance grower profitability by having superior performance and end-use quality by taking advantage of the most recent germplasm and technology advances. Organic, healthier grains, and hybrid wheat are emerging market opportunities.
Potential Impact: The proposed research will provide the Nebraska wheat grower with superior hard winter wheat varieties and position the small grains industry for future growth in new markets. The past contributions of the Nebraska wheat breeding efforts have been enormous. New varieties with the potential to increase the state yield by 1 bushel/acre could potentially increase farm income by $4,000,000 annually (using current wheat prices). In addition, the new knowledge and skilled workers developed by this research will expand breeding concepts, our breeding practices, and private sector investment thus making the development of new varieties and hybrids from public and private programs more efficient.

Project Budget: A new system for royalty sharing was implemented in 2015. In addition, the new wheat, barley, and triticale varieties that are being released and will provide additional revenues to the Wheat Board (e.g. receive 50% of the royalty split) will have their greatest impact in the future. In this transition period, it is hard to budget so this budget reflects our real costs in the hopes that some of the royalties returned to the Wheat Board will be used to offset these costs. State support for this project has been and we expect will continue to be reduced as part of the University budget cuts (especially relating to labor), while costs have increased. Small grains breeding is labor intensive, hence most of the expenses relate to part time student help. Small grains breeding also requires testing throughout Nebraska. Therefore, the other major expenses are travel expenses, which include vehicle costs to transport project workers to the field sites throughout Nebraska; seed increases in Arizona, greenhouse rental for our crossing and partial seed increase; irrigated research in western NE, and prorated rental of NIR equipment, envelope printing, etc. The hybrid wheat effort will be funded by endowments and nationally competitive grants.

Budget Justification:

Student Labor: Wheat breeding is very labor intensive. With recent cuts in technical support we are requesting 2 months salary for a technologist. We expect to hire at least 7 summer students for May, June, July, and August (e.g. 7 students x 3.5 months x 180 hours/month x $9.5
0/hour (average student cost)) for summer help and 3 students (e.g. 3 students x 8 months x 26-27 hours/month x $9.5/hour) for part time help in the academic year. The hourly wage for the student help includes fringe benefit costs. The student costs may be reduced during the academic year by using some work study students where the amount paid by the project is 20% of the total.

Technical, Shop, and Other: We typically use our farm crews for land preparation and some equipment repair. We also have our equipment serviced by specialists in this area.

For Administrative Use *Effective Dates*	***PROPOSAL BUDGET***

PRINCIPAL INVESTIGATOR(S): P.S. Baenziger, D. Rose, and D. K. Santra

PROJECT TITLE: Improving Winter Wheat Varieties for Nebraska

PROPOSED BUDGET SUMMARY *See Narrative Below*		*FUNDS REQUESTED FOR* *FY 19*	*FY 20*
		Year 1	***Year 2***
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates		*0*	*0*
2. Research Associates – Post doctorate		*0*	*0*
3. Other Professionals		*6667*	*6667*
4. Prebaccalaureate Students		*47959*	*47959*
5. Secretarial – Clerical			
6. Technical, Shop, Other		*5000*	*5000*
7. Graduate Students		*0*	*0*
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%, 40% or 50%		*3500*	*3500*
2. Grad Student @ 38% plus Health Ins.		*0*	*0*
C. NON-EXPENDABLE CAPITAL EQUIPMENT *($5,000 or more; more than 2 years use)*		*0*	*0*
D. TRAVEL	*Domestic*	*4000*	*4000*
	Foreign	*0*	*0*
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		*62874*	*62874*
F. TOTAL AMOUNT OF THIS REQUEST		*130000*	*130000*

INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.

Fringe benefits are calculated at 30% for staff and technical support and 0% for student labor.

Travel: We estimate 6 days of a two-person crew for planting in central and western Nebraska (2 x 6 x $75/day = $900) and 8 days of a six-person crew for harvest in central and western Nebraska (8 x 6 x $75.00day = $3,600), and three to four trips in central and western Nebraska for note taking for a two-person crew for 2 days (4 x 2 x 2 x $75/day = $1,200). The total ($5,700) exceeds the amount requested, but some travel ($1,700) will be paid for by grants to the barley and hybrid wheat projects which have trials at the same sites. Hence, we are requesting $4,000 on this grant proposal.

All Other Direct Costs: The four main items in this category are: 1. greenhouse rental which includes 3 major greenhouse bays which allow two cycles of crossing and over 10,000 pots of parental material and seed increases (estimated to be $12,000), 2. $14,474 for irrigated research in western Nebraska, 3. Prorated use of shared equipment (NIR diode analyzer, envelope printer, etc.) estimated to be $4,900 and equipment maintenance on our trucks, trailers, sprayer, planters, combines, and tractors is estimated to be $12,000, and 4. Materials and Supplies (estimated to be $19,500 for planting envelopes, harvest bags, labels for plots and greenhouse pots, chemicals for DNA extractions and our molecular marker efforts, pesticides and fertilizer for our fields). In addition, there will be miscellaneous supplies purchased to maintain the extensive field plot equipment necessary for wheat breeding. The irrigated research appears to be one of the best investments the program has made recently in that early, high yielding lines can be identified that are suitable for irrigated production (expected to increase) and for high yielding rainfed environments (e.g. eastern NE), such as NI04421 which was released as Husker Genetics Brand Robidoux as well as a number of new elite experimental lines. The irrigated program has added a higher yield potential to our breeding program.

Summary of Accomplishments

In 2016-2017 season, 1,120,000 acres of wheat were planted in Nebraska and 1,020,000 were harvested with an average yield of 46 bu/a for a total production of 46,920,000 bu. The crop generally got off got a good start and survived the winter, but in the spring a number of diseases and wheat stem sawfly were abundant. In western and central Nebraska, wheat streak mosaic virus was quite common. Wheat stem sawfly also continued to expand into Nebraska from the west, though fortunately parasites lessened some of the damage. In eastern Nebraska, the rusts (led by stripe rust and then leaf rust were very common). In 2015-2016 season, 1,370,000 acres of wheat were planted in Nebraska and 1,310,000 were harvested with an average yield of 54 bu/a (a record yield/acre) for a total production of 70,740,000 bu. In 2014-2015 season, 1,490,000 acres of wheat were planted in Nebraska and 1,210,000 were harvested with an average yield of 38 bu/a for a total production of 45,980,000 bu. The yield losses due to controllable fungal diseases in eastern Nebraska in 2015, 2016, and 2017 were 44%, 32% and 16%, respectively. Despite continued genetic improvement, the main determinant in wheat production seems to be acres harvested, government programs, and weather (which also affects disease pressure and sprouting). This is an economic reality in understanding wheat yields and productivity in NE.

NE10589, marketed as Husker Genetics Brand 'Ruth' Hard Red Winter Wheat, again had an excellent year. Based on the three-year averages, it was the highest yielding line in the West and West Central districts, while being in the highest yielding group of lines in the Southeast and South Central districts. It is a broadly adapted impact wheat. The project formally released 2 new wheat lines in collaboration with Limagrain (LCS Link and a line licensed to a LCS third party) and developed our first approved 2-gene Clearfield line (NHH144913-3, expected release in 2018) and released 7 new triticale lines (NT055421, NT07403, NT09423, NT11406, NT11428, NT12414, and NT12434). NT12434 was licensed to Limagrain and will be marketed as LCS Bar. NT12414 is also under consideration for licensing. PVP certificates have been submitted for NT07403, NT09423, NT11406, NT11428, and NT12434. These five lines are currently grown from the New York to New Mexico. NHH144913-3 seems to be well adapted to Nebraska and regoins north of Nebraska. In the 2017 Northern Regional Performance Nursery with the data reported so far, it ranked third in the region.

In our hybrid wheat effort, we sprayed with a chemical hybridizing agent (CHA) our third crossing block (split between TX and NE) and harvested 650 experimental hybrids in Nebraska (3 locations) and collaboratively with Texas (3 locations). We achieved good sterility in the hybrids. Though the hybrid seed is shriveled by the use of a CHA, it did not affect grain yield, hence hybrids accurately estimate heterosis. Reciprocal differences were rare, hence the direction of the cross seems to have little effect on hybrid performance. We have screened over 600 lines for anther extrusion, a key component for cross pollination in wheat and have initiated studies to identify beneficial attributes in the female parent. As part of our healthy grains, we continue to identify ways to reduce Cd in wheat, while attempting to increase Zn and Fe. For simplicity, analyzing whole grain samples is the easiest and most relevant for consumer, but we can more efficiently select at the 3 week after anthesis stage if time is critical. Our solid stem segregating populations were grown at Alliance and the highest yielding populatons are now undering single seed descent to reduce the time from cross to release. In barley, we will no longer exclusively release lines through a single company. In the past, only one company wanted to work with our barley varieties, so the release process was effectively an exclusive release. However, there is now greater interest in barley and a general release is preferred and actually more sustainable to ensure growers can access improved barley seed. With exclusive releases, barley seed availability was confined by the company's plans. Finally, to ensure the program is working coherently, the small grains team at the University of Nebraska and our stakeholders developed a strategic plan for our future.

Continued support from the Nebraska Wheat Board is gratefully acknowledged.

Name of the check-off board to which proposal will be submitted: Nebraska Wheat Board

Project Title: State Variety Testing of University of Nebraska and USDA-Bred Winter Wheat "in-pipeline for release experimental lines" and released varieties.

Project Year/Time Period: July 2018-June 2019
This is a research project primarily, but will also affect domestic marketing.
This is a renewal project.
Amount Requested: $25,000
Project Duration: July 1, 2018 to June 30, 2019.

Principal Investigators:
P.S. Baenziger (coordinator) 362D Plant Science Building, University of Nebraska, Lincoln, NE 68583-0915, Phone: (402) -472-1538, Fax: (402)-472-7904, pbaenziger1@unl.edu
Co-PI:
Teshome Regassa, Dept. of Agronomy and Horticulture. Phone 402-472-1489, email tregassa2@unl.edu

Organization: Department of Agronomy and Horticulture, 202B Keim Hall, University of Nebraska, Lincoln, NE 68583-0915, (402-472-5132, Fax: (402)-472-7904, hsteffens4@unl.edu

Body of Project
Abstract:
One of the most important aims of the Nebraska winter wheat improvement effort is to identify and help Nebraska wheat growers choose the most suitable winter wheat varieties to grow in order to achieve the highest yield and profitability per acre and produce the best quality wheat. A number of new lines originate from the breeding program each year that need to be compared to currently released varieties, experimental lines from other programs, and tested under farmers' management systems. This project will cover the testing fee for "new experimental lines" and their comparison released varieties across the state. The project will also create a platform for evaluating "new experimental lines" side by side with established Nebraska varieties, and varieties promoted for the specific location from public and private breeding programs elsewhere. As the Wheat Board is aware, the State Variety Testing service, to ensure its stability and viability, has enacted a fee for all entries tested.

Project Outcomes: The project enhances wheat variety development efficiency by providing test plots in farmers' fields convenient for demonstration of new varieties, continued evaluation of existing varieties, and creates a favorable platform to deliver the information to wheat producers through field days, web-based reports, and local extension education programming. Producer feed-back during such extension programs remain instrumental in re-directing the wheat program to address emerging producer or clientele needs. Information generated by this project after harvest, are made available to producers and clientele through listserv mailing, web-postings, and the distribution of extension circular 103 also known as the Fall Seed Guide. The project will create another information tool Nebraska producers will use to make informed decisions as to which variety to grow, and grow high quality wheat.

Method or Approach: Recently the University of Nebraska State Variety Trial testing program initiated a uniform policy where all entries (public, private, experimental, and released) pay the same fee for testing. This approach has the advantages that all line originators are treated equally and should allow a more transparent cost structure to those at the University of Nebraska and those using these

services. This proposal is submitted to help meet the costs of in state testing. As royalties are distributed and shared on these varieties and future varieties, it is hoped that the royalties will more than cover these costs. Newly developed experimental wheat breeding lines being considered for commercial release will be tested in replicated public yield trials (dryland or rainfed, and irrigated) across the state of Nebraska. Agronomic performance will be compared to currently grown Nebraska cultivars and cultivars from neighboring states, and to the long-term check cultivars: Turkey, Scout 66, Mace and others. As varieties become obsolete, they will be removed from the trial to reduce costs. Grain yield, grain volume weight, protein content, heading dates, disease resistance/susceptibilities, plant heights, etc. will be evaluated. The results will be analyzed, summarized, and shared as described in the technology transfer agreement. This is a crucial step in the state wheat improvement process to determine if new experimental lines that have superior performance in on-farm testing will replace current varieties under production whose performance is waning due to aging, breakdown of fixed traits and development of susceptibility to ongoing production challenges.

Experimental lines of winter wheat from the cooperative USDA-University of Nebraska wheat breeding program will be identified for testing across the state in the Nebraska Winter Wheat Variety Test by the PIs in consultation with the Nebraska Crop Improvement Association and the Nebraska Foundation Seed Division. In addition, the project investigators will identify special purpose entries that can serve as a check or standard from Nebraska or elsewhere. Performance data will be posted on the Variety Testing Webpage as well as reported in the Fall Seed Guide. Testing of promising experimental lines is recommended to be done for a minimum of three years before release. Of course, lines that show little promise will be dropped after the first or second year in the trial. The number and specific tenure of a line in the testing program will be determined by the investigators.

Timeline and milestones for research: This is an ongoing project that is critical to providing useful data to Nebraska wheat producers and the seed industry.

Project locations: Testing site selection is done by collaborators at each district in cooperation with local extension educators (West District (4-5 locations), West Central District (5-6locations), South Central District (1 location) and Southeast District (4 locations)). There is one irrigated testing site each for the West District and West Central District. Collaborators will be paid testing fee depending on the number of experimental lines and varieties they plant and harvest in their respective region. Collaborators are required to refund any fee received if adequate data is not received on time.

Relevance: The Nebraska Wheat Board is committed to testing the lines it has helped develop so that it stakeholders and constituents can make sound decisions based upon data that are created transparently and analyzed using the best statistical tools possible.

Impact: Collaborators are encouraged to involve and co-op local extension educators in site/farmer selection and other trial management activities. Plots will be labeled so that extension educators will use for field plot meetings, field days, and others educational purpose as needed. Feed-back obtained will be used to sharpen up future efforts to improve wheat production. Field maps will be available to interested wheat scientists for field evaluation of the stated new varieties during the season. Public inspection of these plots during the cropping season and feed-back will be encouraged. Results of all tests will be included in the Wheat Variety Testing Extension Circular for the years tested. Results will also be made available on the Variety Testing website. Nebraska Wheat Board will be recognized for funding the trials at each location by signs stating the source of support.

Method Suitability: The only way to convince growers and seed producers of the value of a line is through testing in their region. This proposal is to provide for that required testing.

For Administrative Use Effective Dates **7/2018 to 6/2019**	**PROPOSAL BUDGET**

PRINCIPAL INVESTIGATOR(S): P. Stephen Baenziger and Teshome Regassa

PROJECT TITLE: State Variety Testing of University of Nebraska and USDA-Bred Winter Wheat "in-pipeline for release experimental lines" and released varieties

PROPOSED BUDGET SUMMARY *See Narrative Below*		FUNDS REQUESTED FOR FY **Year 1**	FY **Year 2**
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals – Lincoln tech support			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%			
2. Grad Student @ 41% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)			
D. TRAVEL	Domestic		
	Foreign		
E. ALL OTHER DIRECT COSTS –			
• **$150.00/entry and location assuming 167 total entry-locations for a year**		25,000	
F. TOTAL AMOUNT OF THIS REQUEST		25,000	

INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.

BUDGET NARRATIVE:

A. Salaries & Wages	$0.0
B. Fringe Benefits	$0.0
C. Non-expendable Capital Equipment	$0.0
D. Travel	$0.0
E. All Other Direct Costs	$**25,000**

The funds requested here are to pay for roughly one half of the variety testing fees, to test widely grown released lines for comparison to newly developed experimental lines for potential release. We hope to obtain funds from the Agricultural Research Division Innovation Funds. We are concerned that those may not be allocated this year, but we feel that the State Variety trial provides critical support to the Nebraska Wheat Growers and Wheat Industry and that shared support is necessary. Currently the fee per trial is $150/location. Based upon the number of entries and the number of locations that they were tested in, we estimate $50,000 to cover all of the in state testing fees. Our estimate is based upon 60 entry-locations in the Southeast district, 15 entry-locations in the South Central district, 110 entry-locations in the West Central district, 110 entry-locations in the West district, and 40 entry-locations in the irrigated trials. If fewer entry-locations are used, the budget request will be lowered before the Wheat Board makes its final quarterly payment.

Summary of Accomplishments:

The accomplishments can best be found at: http://cropwatch.unl.edu/winter-wheat-variety-test-results The reports were uploaded and made available as soon as the data arrived from the cooperators.

Name of the check-off board to which proposal will be submitted: Nebraska Wheat Board

Project Title: Out of State Variety Testing of University of Nebraska Winter Wheat Varieties (Released and Experimental).

Project Year/Time Period: July 2018-June 2019
This is a new/ongoing project.

Principal Investigators:
P.S. Baenziger (coordinator) 362D Plant Science Building, University of Nebraska, Lincoln, NE 68583-0915, Phone: (402) -472-1538, Fax: (402)-472-7904, pbaenziger1@unl.edu;Jeff Noel, Husker Genetics, Agricultural Research Division; 402-540-9359; jnoel2@unl.edu

Organization: Department of Agronomy and Horticulture, 202B Keim Hall, University of Nebraska, Lincoln, NE 68583-0915, (402-472-5132, Fax: (402)-472-7904, hsteffens4@unl.edu

Body of Project

Abstract:
Dr. Baenziger's winter wheat variety breeding programs develop varieties that are commercially adapted to other states. These states include Colorado, Kansas, Wyoming, South Dakota, North Dakota, Minnesota, Texas and Oklahoma. Relevant performance data supports the commercialization of these lines that generate license fees that return to the University and to the Nebraska Wheat Board to support future line development, line testing, and small grains research.

Project Outcomes:
This proposal is submitted to help meet the costs of out of state testing. License fees generated from out of state agreements and sales hopefully will more than cover the expense of testing. Recently to support our in state variety testing, our testing program has charged for testing all entries from public and private breeding programs. Hence our lines that are tested out of state now pay their state testing fees. Our lines have regional impact, but they must be tested in other states to document that impact.

Method or Approach:
Released cultivars and elite lines that have been tested in regional nurseries (thus allowing better targeting of our lines) and that have merit will be advanced and based upon their areas of adaptation will be tested in appropriate replicated state variety trials. In most cases, three released lines and potentially three experimental lines will be tested in trials in other states. The lines will differ in the various state trials based upon perceived adaptation. Our goal it to effectively commercialize wheat varieties in their adaptive production region to maximize return to the investment in their development
Timeline and milestones for research: This is a revived project (due to limited funds last year) that is critical to providing useful data to Husker Genetics and the seed industry.
Project locations: Colorado, Kansas, Wyoming, and South Dakota
Relevance: The Nebraska Wheat board has a long standing interest in allowing other states to use the varieties that helped support in their development.
Potential Impact:
Development of sales for Nebraska Certified Seed Growers and Generation of License Fees from business entities in the Great Plains.

For Administrative Use 7/2018 to 6/2019 Effective Dates	**PROPOSAL BUDGET**

PRINCIPAL INVESTIGATOR(S): Jeff Noel, Chad Lanik and Steve Baenziger
PROJECT TITLE: Out of State Variety Testing of University of Nebraska Winter Wheat Varieties (Released and Experimental).

PROPOSED BUDGET SUMMARY *See Narrative Below*		FUNDS REQUESTED FOR FY **Year 1**	FY **Year 2**
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals – Lincoln tech support			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%			
2. Grad Student @ 41% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)			
D. TRAVEL	Domestic		
	Foreign		
E. ALL OTHER DIRECT COSTS – Entry Fees from Testing States			
		10,000	10,000
F. TOTAL AMOUNT OF THIS REQUEST		10,000	10,000

INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.

BUDGET NARRATIVE:

A. Salaries & Wages $0.0
B. Fringe Benefits $0.0
C. Non-expendable Capital Equipment $0.0
D. Travel $0.0
E. All Other Direct Costs $10,000 – Entry fees from testing states which vary by state and the number of regions within a state that lines are tested in.

NE Wheat Board Research Project Proposal

Submitted to: Nebraska Wheat Board
Project Title: A Disease Management Tool for Stripe Rust of Wheat in Nebraska
Type of Project: Research
New or Renewal: New
Project Duration: July 1, 2018 to June 30, 2019. Year 1 of 2-year project
Total Amount Requested: $15,000

Principal Investigators:
Robert M. Harveson, Plant Pathologist, email: rharveson2@unl.edu, Phone: 308.632.1239; Dipak K. Santra, Alternative Crops Breeder, email: dsantra2@unl.edu, Phone: 308.632.1244; Panhandle Research and Extension Center, 4502 Avenue I, Scottsbluff, NE 69361, Fax: 308.632.1365

Organization:
University of Nebraska Lincoln, Panhandle Research and Extension Center, 4502 Avenue I Scottsbluff, NE 69361, Email: scruz3@unl.edu, Work Phone: 308.633.3802, Fax: 308.632.1365

Body of Project

Abstract:
Stripe rust, caused by fungal pathogen (*Puccinia striiformis* f. sp. *tritici*), is a serious disease of wheat worldwide and in the Pacific North West (PNW) region where cool/moist weather prevails. Over the last decade, the disease has caused serious yield loss to Nebraska wheat. New pathogen races are presumed to be responsible. No predictive model is available for proactive management of stripe rust in Nebraska. The proposed project will focus on developing a decision tool to assist with making fungicide applications based on several factors such as level of disease resistance in the variety, growth stage, time of first symptoms observed, and weather. Replicated field trials with resistant/susceptible wheat varieties will be conducted at two sites. Four treatments (three fungicide applications plus one untreated control) will be employed. This decision-making tool should be applicable to any production system in Nebraska and will reduce yield losses resulting in improved economic returns.

Project Outcomes:

Stripe rust is a serious disease of wheat worldwide, caused by the fungal pathogen (*Puccinia striiformis* f. sp. *tritici*). Over the last decade, the incidence and severity of stripe rust has increased dramatically in Nebraska. In fact, damage to wheat production has been so widespread that it appears that this disease has now displaced the virus disease, wheat steak mosaic, as the most important and economically damaging disease of wheat in western part of the state.

The disease has occurred historically wherever wheat is grown under cool moist environmental conditions during the season. Thus it has been regarded as a low temperature disease and problematic only during cool weather. Historically, it was primarily restricted to the cool and damp Pacific Northwest region of the USA and California. After 2000, it began to appear nationwide on all forms of wheat, causing significant yield losses in new locations where it rarely was ever present - including more than 20 states from coast to coast and throughout the entire Great Plains from Texas to North Dakota. Since 2000, the disease has emerged to consistently induce severe economic losses in Nebraska under very warm conditions that were previously thought to be impossible.

The formation of new pathogen races is being proposed now to explain the widespread nature of its recent appearances and high levels of yield loss. These races have been demonstrated to cause disease more rapidly and be more aggressive at higher temperatures than previously observed. Furthermore, they have seemingly displaced the old isolates across the expanded geographic regions, suggesting that the new isolates were more fit than older ones. In doing so, they have additionally overcome the most effective

genetic resistance used in the United States wheat crop, converting previously resistant cultivars to susceptible ones.

This new, more aggressive pathogen variant has also apparently adapted itself further to better withstand winter conditions in Nebraska and survive after infecting fall-planted wheat crops. Numerous reports of stripe rust in wheat were noted this fall throughout Panhandle wheat fields, particularly in Kimball and Banner counties. In 2016, we also received reports of additional epidemics ranging from Garden County in the east to Wyoming border in the west and to northern Box Butte County near Hemingford, thus being widely distributed across the Panhandle. This was the third successive year that stripe rust has been found on fall-planted wheat in the Panhandle (2014-16). These findings have also coincided with disease outbreaks resulting in serious damage in 2015 and 2016 (up to 71% yield loss on susceptible cultivars) from numerous locations, but curiously this was not the case in 2017.

Due to the distressing stripe rust epidemics in Nebraska wheat crops over the last decade, we are proposing new investigations beginning in 2018-2019 that attempt to help producers better manage this disease. This disease appears to be an endemic problem that we will now have to consistently face each year now. Thus it is imperative to establish a tool that will predict disease development and implement management decisions on this tool, as no such device is available to the Nebraska wheat producers for this purpose. The PI has earlier been involved with a similar mechanism for treating a rust disease in dry beans for Nebraska (Harveson et al. 2013). Stripe rust in wheat is a comparable disease to common rust in bean. The proposed project will focus on developing a similar technique for stripe rust management in wheat, tentatively referred to as "Stripe Rust Disease Management Decision Tool "following the template for the bean rust disease.

Although not a true disease forecasting model, it will assist growers to estimate the potential for disease occurring in their own fields based on a series of factors which are required for disease to cause damage. These factors, among several others, include: level of genetic resistance in cultivars, crop stage at time of infection, 10-14 day weather forecast, part of the season infection occurs, incidence of disease in fields, and yield expectations/inputs in crop. The predictive tool will eventually look similar to the table for dry bean rust predictive below, and will be modified or improved as needed based on the data generated in the project.

Worksheet for Determining Strategies for Fungicide Applications in Wheat

RISK CATEGORIES for Stripe Rust Disease Forecast (update on a weekly basis)				Your Score
Total Rainfall (inches) summarize cumulative rainfall weekly up to Heading Growth Stage				
Less than 0.1" (1)	0.1 – 0.5" (2)	0.5 – 1.0" (3)	More than 1" (4)	
Daily High Temperature (F), summarize weekly up to Feekes'9 Growth Stage (Flag Leaf)				
Less than 76°F (4)	76 - 81°F (3)	81 - 86°F (2)	More than 86°F (1)	
Forecasted Total Rainfall (inches), weekly between Tillering and Heading Growth Stages (Feekes' 10.5)				
Less than 0.1" (1)	0.1 – 0.5" (2)	0.5 – 1.0" (3)	More than 1" (4)	
Forecasted Daily High Temp (F), weekly between Tillering and Heading Growth Stages (Feekes' 10.5)				
Less than 76°F (4)	76 - 81°F (3)	81 - 86°F (2)	More than 86°F (1)	
Forecasted Av. Wind Speed (mph), weekly between Tillering and Heading Growth Stages (Feekes' 10.5)				
Less than 1 mph (1)	1-5 mph (2)	5-10 mph (3)	More than 10 mph (4)	
Wheat Rotation of less than 3 years and/or Volunteer Wheat Observed Nearby (within 2 miles)				
No wheat (3 yr) No Volunteers (1)		Recent Wheat OR Volunteers Nearby (2)	Recent Wheat and Volunteers Nearby (4)	
Yield Potential Estimate-in relation to plant population, fertility, irrigation inputs, current growing season				
Low (1)		Moderate (2)	High (4)	
Irrigation Practice/Schedule after Heading to Ripening Stage (In case of Irrigated wheat)				
No Irrigation – Rainfed Only (1)		Less than 0.25"/day (2)	More than 0.25"/day (4)	
Varietal Reaction to Prevalent Races of Stripe rust				
Resistant (1)		Unknown (2)	Susceptible (4)	
Common Rust Disease Risk – Total Score:				

If your Total Score is: * More than 25 = High Risk * 20-25 = Moderate Risk *Less than 20 = Low Risk
If the susceptible variety is planted in a field or region with a history of disease and the total score is 20 or higher, consider treatment with a labeled fungicide at the first confirmed sign of disease (often the Feekes'10 to 10.5 growth stages) on numerous plants in the field or nearby fields. Follow a 5- to 10- day interval between sprays, depending on disease pressure and the fungicide selected until the pre-harvest interval or the heading growth stage is reached, whichever occurs first.

Objectives:

1) Develop a decision-making tool for most effectively utilizing fungicide applications for stripe rust management.

2) Demonstrate the importance of integrating multiple strategies for managing the disease, including the predictive model, resistant cultivars, and timely fungicide applications.

Methodology

Replicated field trials with resistant and susceptible wheat varieties will be conducted at two different sites in the Panhandle. The trials will be planted at two sites with 4 cultivars (2 resistant – Ruth and SY-Monument; and 2 susceptible – Panhandle and Camelot). The no-till drill (partially funded by the Wheat Board last year) will be used to plant the proposed study. The concept is to estimate the risk of disease development based on the factors mentioned above occurring at each site, and make fungicide applications utilizing 4 treatments (3 applications & untreated control). The 3 applications at each site based on: 1) first sign of disease; 2) first appearance of flag leaf); and 3) predictive model. These studies will be mirrored with similar trials in collaboration with Andrew Friskop (cereals extension plant pathologist at North Dakota State University). Trial will be harvested to measure yield and test weight. Data will be analyzed by appropriate statistical method to assess effect on stripe rust and treatments on wheat yield and test weight.

Research locations: Two trials located at: 1) Scottsbluff, Scotts Bluff. Coand 2) High Plains Ag. Lab, Sidney (Cheyenne Co.).

Technology Transfer: Results will be disseminated at grower meetings, field days, research reporting sessions, and through written and electronic publications.

Relevance: Managing this disease will require several new concepts. First we need to realize now that this pathogen is now capable of causing disease under conditions not previously considered possible. We also need to accept the fact that it will take an integrated approach to successfully manage stripe rust, consisting of multiple control measures, including both timely fungicide applications and use of resistant cultivars.

Potential Impact: The proposed research project will assist growers in reducing losses due to this devastating disease and improve economic returns and sustainability of wheat production in Nebraska. If successfully developed, this model will be reflective of and applicable to any farming system regardless of production practices or geographic location. To our knowledge, it will also be the only model of this kind developed for stripe rust in wheat.

Reference

Harveson, R.M., H.F. Schwartz, and J.R. Steadman (2013). Rust of Dry Bean. UNL Extension NebGuide G1766

For Administrative Use *Effective Dates: 7/1/18-6/30/19*		***PROPOSAL BUDGET***	
PRINCIPAL INVESTIGATOR(S): Dr. Harveson/Dr. Santra *PROJECT TITLE: A Disease Management Tool for Stripe Rust of Wheat in Nebraska*			
PROPOSED BUDGET SUMMARY *See Narrative Below*		*FUNDS REQUESTED FOR*	
		FY19	*FY20*
		Year 1 of 2	***Year 2 of 2***
A. SALARIES AND WAGES Commodity Board usually does not pay the cost for Project Investigators			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals			
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other		*$7,800*	*$7,800*
7. Undergraduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%, 40% or 50%		*$3,900*	*$3,900*
2. Undergrad Student @ 8.1%			
C. NON-EXPENDABLE CAPITAL EQUIPMENT ($5,000 or more; more than 2 years use)			
D. TRAVEL	*Domestic*	*$2,300*	*$2,300*
	Foreign		
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		*$1,000*	*$1,000*
F. TOTAL AMOUNT OF THIS REQUEST		*$15,000*	*$15,000*
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.			

BUDGET NARRATIVE:

A. Salaries & Wages ($7,800): Funding for technician's salary (2.75 person months) who will assist with field preparation, planting, weeding, data collection, and other tasks related to project objectives.

B. Fringe Benefits ($3,900): Personnel benefits are estimated at the rates shown below. The actual cost of benefits for each person will be charged to the project.

Fringe Benefit Estimates				
Base Salary > $70,000	30%		Graduate Students*	38%
Base Salary $40,000 - $70,000	40%		Part-Time Employees (less than 0.5 FTE)	8.1%
Base Salary <=$40,000	50%		Undergraduate Students (Full Time)	0%

C. Non-expendable Capital Equipment: N/A

D. Travel ($2,300): Funding for the travel to field plots and extension/professional meetings as they relate to the overall project. Expenditures to include, but not limited to, mileage, fuel, rental, lodging, meals.

E. All Other Direct Costs ($1,000): Funding for the purchase of supplies necessary to carry out project objectives, including but not limited to, chemicals (fungicides, herbicides), fertilizer, seed packets, stakes, flags, harvest bags, fuels for machinery, harvest fees (combine), and minor repair of machinery.

Title of Project: Mitigating Winter Wheat Losses Caused by Diseases

Type of Project: Research

New or Renewal: Renewal

Total Amount Requested: $34,700

Project Duration: July 1, 2018 to June 30, 2019

Project Coordinator Name, Address, Phone, Fax, and E-mail:

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Additional Participating Institutions: None

Project Abstract:

Wheat lines in the small grains breeding program will be screened for resistance to stem rust, leaf rust, and Fusarium head blight (FHB, scab) in the greenhouse and field. Rust screening will involve planting the lines in the greenhouse, spray-inoculating them with rust spores, incubating the plants under prescribed environmental conditions, and rating disease reaction at the seedling stage. FHB screening will involve inoculating greenhouse- and field-grown lines at anthesis with *Fusarium graminearum* spores and rating disease severity 18 to 21 days after inoculation. Research on integrated management of FHB will be conducted in the field by timing fungicide application at anthesis to wheat cultivars differing in resistance and measuring disease index, *Fusarium*-damaged kernels (FDK), yield, and vomitoxin (DON). Statewide wheat disease surveys will be conducted to identify major diseases occurring in growers' fields. Management recommendations will be provided to growers based on the survey results.

Project Outcomes:

This project will identify disease-resistant wheat lines that will be advanced in the wheat breeding program, culminating in the release of commercial cultivars with effective disease resistance and superior agronomic performance. The best combination of strategies and tactics (variety resistance and fungicide application) for managing Fusarium head blight, a devastating disease of wheat, will be determined. Major diseases of economic importance will be identified during wheat disease surveys whose results will be disseminated to growers, crop consultants, educators, and the public. Information from the surveys will enable growers to make decisions and implement management tactics in a timely manner for effective disease management and profitable wheat production.

Method or Approach:

Stem rust and leaf rust screening: Stem rust race QFCS and a leaf rust race collected from the field during the 2018 growing season will be used in rust screening. Urediniospores will be increased on a susceptible wheat cultivar. Fully expanded primary leaves of 10-day-old seedlings will be inoculated by atomizing urediniospores suspended in Tween-20 or a light weight mineral oil (Soltrol) onto the leaves. Urediniospores will be harvested into 00-size gelatin capsules with a cyclone spore collector beginning 13 days after inoculation and continuing for two weeks. The harvested spores will be kept in a -80ºC freezer until needed for inoculation. Five seeds of each line will be planted in a plastic cell. Cells will then be placed on plastic flats. Standard soil mix used in the Plant Pathology greenhouse will be used. Two check cultivars, 'Arapahoe' (resistant) and 'Cheyenne' (susceptible), will be included in the screen. The flats will be placed on a bench in a greenhouse room set at 20ºC and a 16-hour photoperiod. Fully expanded primary leaves of 10-day-old seedlings will be inoculated by atomizing a urediniospore suspension onto the leaves. Inoculated seedlings will be placed in a transparent plastic mist chamber for 12 hours in the dark at 20ºC. They will then be moved to a growth chamber under the same conditions described above for several days and then onto a greenhouse bench. The seedlings will be scored for stem or leaf rust infection type 10 to 14 days after inoculation based on a standard scale used in this type of screening. Seedlings with infection type (IT) 0, 1, or 2 will be considered resistant. Seedlings with IT 3 or 4 were considered susceptible.

Integrated management of FHB: A field experiment will be conducted to investigate the effects of cultivar resistance and fungicide application on FHB and DON in winter wheat. The experiment will be located at the University of Nebraska Havelock Research Farm near Lincoln, Nebraska. The experimental design will be a split plot in randomized complete blocks with four replications, with cultivars as whole-plots and fungicide x inoculation treatments as sub-plots. Four cultivars adapted to Nebraska will be used: Overland (moderately resistant), Millennium (moderately resistant), Roubidoux (susceptible), and Wesley (susceptible). The fungicide x inoculation treatments will be 1) untreated, inoculated check; 2) Prosaro (6.5 fl. oz.) at anthesis, inoculated; 3) Miravis Ace (11.5 fl. oz.) at anthesis, inoculated; 4) Miravis Ace at Feekes

10.5, inoculated; 5) Prosaro at anthesis, non-inoculated; and 6) untreated, non-inoculated check. Fungicides will be applied with a CO_2-powered backpack sprayer equipped with four Teejet 800-1 VS nozzles and calibrated to deliver 20 gallons of fungicide-water mixture per acre. In treatments 1 to 4, plots will be spray-inoculated with spores of *Fusarium graminearum* (1×10^5 spores/mL) 24 hours after fungicide application at anthesis. To enhance inoculum buildup in the plots as well as disease development, corn kernel inoculum will be spread weekly on the soil surface starting at three weeks before anthesis. FHB intensity will be assessed at the soft dough growth stage. At and following harvest, yield, test weight, *Fusarium*-damaged kernels (FDK), and DON concentration will be determined.

Wheat disease surveys will be conducted from mid-April to mid- or late June by scouting growers' fields, state variety trials, and UNL research plots in the wheat growing regions in Nebraska. Results from the surveys and management recommendations will be disseminated to growers and the public through UNL's CropWatch newsletter.

Relevance:

Winter wheat is an economically important crop in Nebraska and the western Great Plains states. Diseases can cause major yield losses in winter wheat production. Over the last 10 years, epidemics of Septoria tritici blotch, tan spot, black chaff, Fusarium head blight, leaf rust, stripe rust, and wheat streak mosaic have caused significant yield losses in wheat production in the state. There is a need to develop disease-resistant wheat cultivars. To achieve this goal, evaluation of wheat lines for resistance to diseases must continue. To maximize the effectiveness of disease management, it is necessary to integrate genetic resistance or disease tolerance with additional management strategies such as cultural practices and fungicide application. Therefore, research on integrated disease management is necessary to determine the most efficacious and cost-effective combination of management strategies and tactics. Wheat diseases and their levels of severity vary from year to year depending on the environmental conditions that prevail during the growing season. For example, in 2017 wheat streak mosaic was widespread throughout the state with the southern Panhandle most severely impacted. Information on the diseases that occur each year can be used to plan future management strategies, prioritize resources, and redirect research and breeding efforts. This information can be obtained through annual wheat disease surveys. These surveys are also instrumental in detecting exotic diseases and pests and therefore can play an important role in biosecurity.

Impact:

Screening wheat lines for resistance to diseases will identify lines that will be advanced in the breeding program. The disease resistance impact of a wheat cultivar newly released by the small grains breeding program and grown in Nebraska and surrounding states is estimated at $20 million/year. Information from the research on integrated management of FHB will enable growers to choose the best combination of cultivar, fungicide, and fungicide application timing that will minimize disease and maximize yields. Losses to FHB and DON will be reduced and profits for Nebraska wheat growers will increase. Information from wheat disease surveys will enable growers to make decisions and implement management tactics in a timely manner, which will prevent or reduce losses and increase profits. Knowledge generated from this project will lead to a significant improvement in the economic and social well-being of the citizens of Nebraska and surrounding states.

Method suitability:

The proposed methodology/approach has been proven to be effective by the PI who has used and improved it over the last 12 years. A search of published literature (including the PI's own publications) shows that the methodology is widely used by wheat pathologists in the United States and elsewhere. It is a flexible methodology that is easy to adjust to suit local situations.

Budget:

For Administrative Use *Effective Dates*		***PROPOSAL BUDGET***	
PRINCIPAL INVESTIGATOR(S): *PROJECT TITLE:*			
PROPOSED BUDGET SUMMARY *See Narrative Below*		*FUNDS REQUESTED FOR* *FY*	*FY*
		Year 1	***Year 2***
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals		*20,000*	
4. Prebaccalaureate Students		*2,500*	
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%, 40% or 50%		*6,000*	
2. Grad Student @ 38% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT *($5,000 or more; more than 2 years use)*			
D. TRAVEL	*Domestic*	*3,000*	
	Foreign		
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		*3,200*	
F. TOTAL AMOUNT OF THIS REQUEST		*34,700*	

INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.

BUDGET NARRATIVE:

A. Salaries & Wages
B. Fringe Benefits
C. Non-expendable Capital Equipment
D. Travel
E. All Other Direct Costs

Budget Narrative:

A. Salaries and Wages: $20,000 is requested as salary for a research technologist; $2,500 is requested for hourly salary for undergraduate students
B. Fringe Benefits: $6,000 (30% of research technologist's salary) is requested as fringe benefits for the research technologist
C. Non-expendable Capital Equipment: None is requested
D. Travel: $3,000 is requested for domestic travel to field research plots and for statewide disease surveys
E. All Other Direct Costs:
   $350 for plastic cells for growing wheat in the greenhouse for disease resistance screening
   $1,200 for greenhouse space rental
   $150 for agar media for culturing *Fusarium graminearum* (scab fungus) to be used as inoculum in the field
   $150 for corn kernels used to prepare *Fusarium graminearum* field inoculum
   $650 for field work supplies: wheat seed, backpack sprayers for spray inoculation of scab plots, bags for harvesting
   $700 for land rental

Other Funding Sources:

Agency: U.S. Wheat and Barley Scab Initiative
Project Title: Integrating Strategies to Mitigate Fusarium Head Blight and DON in Winter Wheat

2018-2019 PROPOSAL TO THE NEBRASKA WHEAT BOARD

Project Title: Developing new strategies for integrated management of root rot pathogens of wheat

Project Type: Research

Total Amount Requested: $*29,104*

Project Duration: July 1, 2018-June 30, 2019 (Renewal Year 3 of 5)

Principal Coordinator: Dr. Anthony O. Adesemoye, Asst Professor/Disease Management Specialist, University of Nebraska Lincoln, West Central Res & Ext Center, North Platte, NE 69101. Phone: 308-696-6708. Fax: 308-696-6780. Email: tony.adesemoye@unl.edu

Co-Principal Investigators: Dr. Stephen Wegulo (Professor), UNL Department of Plant Pathology and Dr. P. S. Baenziger (Professor), UNL Department of Agronomy &Horticulture.

Project Abstract
Root and crown rot diseases in wheat are caused by pathogens belonging to many fungal genera. Yield losses from these pathogens range from 5 to 50 percent and could be more severe under conducive weather conditions. We have generated some scientific data about the genetic diversity of pathogens causing root diseases in Nebraska through funding partly from the Nebraska Wheat Board. In a state-wide survey, a total of 48 isolates recovered were identified using morphology and molecular methods. The frequently recovered isolates belong to the pathogen genera of *Fusarium* and *Rhizoctonia*. Also, 250 strains of plant growth promoting rhizobacteria genera *Bacillus* and *Bulkholderia* and fungi *Trichoderma* sp. have been isolated by the PI but the effectiveness of the isolates will be explored. This study will lead to the design of strategies that help to reduce yield losses from root diseases and generate more profit for NE wheat producers.

Introduction
The major pathogens that cause root and crown rot diseases in Nebraska wheat belong to the fungal genera such as *Fusarium*, *Rhizoctonia*, *Bipolaris*, *Pythium*, and *Phoma*. The pathogens are very difficult to manage. Seed treatment against the diseases does not usually last through the season, the effectiveness might be gone by spring. In most cases there are no known resistant varieties. The current price fluctuations and reduction in wheat production (1% less produced in 2018 compared to 2017) is unpleasant and any yield losses from these diseases will worsen the situation.

In a state-wide survey over the past three years, *Fusarium* and *Rhizoctonia* were frequently recovered as the most important soilborne pathogens in Nebraska. Other less common potential pathogens recovered were *Chaetomium*, *Macrophomina*, *Gaeumannomyces*, *Microdochium*, *Cylindrocarpon*, *Thielaviopsis*, *Phoma*, and *Neonectria*. Pathogenicity test have been conducted with the identified isolates. These pieces of information will be helpful for the design of disease management strategies. Studies to understand the biology of the pathogens is essential as well.Plant growth promoting rhizobacteria belonging to the genera *Bacillus* and *Bulkholderia* as well as fungi *Trichoderma* sp. are promising biological control agents for management of soilborne pathogens. Studies to develop an integrated management system that include biological control agents has been initiated. Initial screening of 12 wheat cultivars against pathogens was completed in the greenhouse. Lab assay and greenhouse studies were initiated

in the past year but was hindered by paucity of funds since my proposal to the Wheat Board could not be funded last year. Also, we could not conduct one of the field trials that was previously planned. However, preliminary results from the completed studies showed potential for the joint use of beneficial bacteria and fungi with fungicide seed treatment but further studies are needed in the greenhouse and field. We need further studies to understand pathogen biology and the mechanism of action of biocontrol agents recovered from wheat fields. It is crucial to develop integrated management strategies where the recovered biological control agents and commercial biocontrol products are components. In this proposed study, biological control strains and commercially biocontrol products will be evaluated for biocontrol activities against collected pathogens. In addition to reducing yield losses from root diseases and generating more profits for NE wheat producers, the study has potential applications across the United States.

Preliminary Studies

The funding provided to my program by the Nebraska Wheat Board in 2015 and 2016 helped to identify the two main pathogen genera (*Fusarium* and *Rhizoctonia*) which pose the major threat of soilborne diseases to wheat production in the State. Research efforts were devoted to testing integrated disease management strategies for the two pathogens. I have conducted preliminary assays in the greenhouse and a field trial last year to evaluate Nebraska indigenous *Trichoderma* and plant growth promoting rhizobacteria strains recovered from wheat fields for ability to control the two pathogens. Part of the question is whether biocontrol agents (BCA) can be used compatibly with chemical seed treatments so that growers can use the BCA for better efficacy in the nearest future. Preliminary results showed that beneficial bacteria and fungi can be used jointly with certain fungicide seed treatment but further testing is needed. In collaboration with two companies, Agricen Sciences and Advanced Biological Marketing, I evaluated commercial chemical and biological products and pipeline products for potential use in wheat production. The companies provided funding to support the trials and one of the field trials is ongoing. Fungicide seed treatment is an effective control of which we are examining different types. The combination with an active biological agent that effectively colonizes the plant is being explored to achieve a more successful disease management that will last longer through the season.

Project Novelty and Outcomes

This project will fill an existing knowledge gap of root rot pathogens of wheat in Nebraska through (1) understanding of the biology of root rot pathogens and (2) identifying effective biological control agents in the state. Also, project will lead to the development of integrated management systems effective against root pathogens. It will combine resistance, biological control, and fungicide seed treatment.

Relevance and Impacts of This Study

Root rot pathogens disrupts stand establishment and cause high yield losses. There are projections but there is no research-based data on the levels of damage that these pathogens are causing in Nebraska wheat. Each species in a pathogen genus may respond differently to management practices. The information on the diversity of soilborne pathogen in wheat which we are generating in the state will be the base for designing integrated disease management strategies. It is therefore crucial to continue with this study across wheat production areas of the state and bring it to conclusion. Findings from this project will provide a foundation for choosing the right integrated disease management strategies, leading to (1) reduction in yield losses. (2) Improved profit to Nebraska wheat producers. (3) Scientific understanding of disease development by the major root pathogens of wheat in NE will have applications to scientists, wheat producers, and other stakeholders across and beyond the state.

Method suitability and statement of work to be performed
In 2018/2019, we will (1) examine the biology of pathogens regarding pathogen virulence and disease development and spread, (2) continue to test breeding lines or cultivars for resistance against identified pathogens and (3) commence the development of an integrated management systems that include biological control, resistant cultivars, and fungicide seed treatments.

PROJECT DESCRIPTION
Research Objectives
(1) Screen biological control agents collected within the state against soilborne pathogens in the greenhouse.
(2) Conduct greenhouse tests to evaluate lines from the wheat breeding program and some of the currently grown commercial cultivars for possibility of resistance and interaction of resistance and biological control against important root pathogens in Nebraska.
(3) To conduct laboratory and greenhouse studies to better understand the biology, including the spread and virulence of these major root pathogens of wheat, and disease development in the state.
(4) Conduct integrated pest management field studies with components that include cultivars, fungicide seed treatment, and biological control agents/products.

Method or Approach
Isolation and characterization of beneficial organisms: Potentially beneficial organisms will be recovered from samples through plating on 20% tryptic soy agar medium and serial transfers. Molecular tools will be used for the characterization of biological control agents. Genomic DNA will be extracted from isolates using microbial DNA extraction kits and 16S will be PCR amplified through polymerase chain reaction (PCR). Amplicons will be purified with a commercial kit and sequencing will be done at the University of California Riverside Institute for Integrative Genome Biology (GenCore).

Screening for possible resistance of varieties, biocontrol activity, and interaction of resistance and biocontrol:
More varieties from the wheat breeding program of Dr Baenziger will be challenged with the characterized strains of *Fusarium* and *Rhizoctonia* in the greenhouse to evaluate possible resistance against the pathogens by any of the varieties. Co-inoculation of biocontrol agents and pathogens will be done to identify biocontrol strains. Top beneficial organisms will be inoculated onto the different wheat varieties and colonization of roots will be evaluated to identify lines on which beneficial organisms can establish a strong relationship and then challenged with pathogens to examine if there is any reduction of diseases.

Field studies: Field study will be conducted at the Henry J. Stumpf International Wheat Center" near Grant on integrated management of the major identified pathogens. This study will be repeated in two subsequent years. Studies will integrate biological control agents, breeding lines, and fungicide seed treatment. Three years of field study will be conducted.

Method Suitability
Disease management in this study will integrate biological control, cultivar resistance, and fungicide seed treatment. This method is sound and suitable because the integration of different methods of disease management as a package is the most effective disease management method. No individual disease management method can be as effective. Additionally, integrated management method also enhances sustainability of production. Managing soilborne disease is very difficult but understanding pathogen biology will enhance disease management.

Timeline and milestones for research

Timeline	Research tasks and milestones
July 1, 2018 – Dec 31, 2018	Collaborators planning meetings. Meeting of PI with wheat growers, extension educators, and crop consultants. Greenhouse and lab studies. Start field studies. Sample collection for isolation of biological control agents.
Jan 01, 2019 – Feb 28, 2019	Continuation of lab, greenhouse, and field studies.
Mar 1, 2018-May 30, 2019	More microbial isolation. Molecular identification of biocontrol isolates. Lab and greenhouse assay continues. Monitoring of field studies.
June 1- 30, 2019	Data analysis. Evaluation meeting by collaborators. Write and submit annual reports. Harvest. Write materials for publications.

Project location(s)

Plant samples will be collected from multiple field locations for isolation of potential biological control agents. Also, we will have a field trial at the Wheat Center in Grant. We will continue to collaborate with wheat growers, extension educators, and crop consultants. Laboratory work and greenhouse studies will be conducted at the West Central Research and Extension Center, North Platte.

Technology Transfer

The principal investigator has an extension appointment and will disseminate findings at growers' meetings, field days, crop production clinics, UNL's CropWatch newsletter, and other extension and peer reviewed publications. Presentations will be made at regional and national meetings by the PI and the postdoc scholar.

References

Adesemoye, A. O., Mayorquin, J. S., Wang, D. H., Twizeyimana, M., Lynch, S. C., and Eskalen, A. 2014. Identification of species of Botryosphaeriaceae causing bot gummosis in citrus in California. Plant Disease 98: 55-61.

Guillemaut C., Edel-Hermann V., Camporota P., Alabouvette C., Richard-Molard M., and Steinbe C. (2003). Typing of anastomosis groups of Rhizoctonia solani by restriction analysis of ribosomal DNA. Canadian Journal of Microbiology 49: 556–568.

Hernandez Nopsa, J.F., Wegulo, S. N., Panthi, A., Hallen-Adams, H. E., Harris, S. D., and P. S. Baenziger. 2014. Characterization of Nebraska Isolates of Fusarium graminearum Causing Head Blight of Wheat. Crop Science 54: 310-317.

Parikh, L., Kodati, S., Eskelson, M. J., and Adesemoye, A. O. Identification and pathogenicity of *Fusarium* spp. in row crops in Nebraska. Crop Protection (Revised version submitted).

Smiley, R. W., Gourlie, J. A., Easley, S. A., Patterson, L.-M., and Whittaker, R. G. 2005. Crop damage estimates for crown rot of wheat and barley in the Pacific Northwest. Plant Disease 89: 595-604.

FY19* BUDGET NARRATIVE (i.e., details for proposed expenditures for FY19* budget categories):

A. Salaries & Wages: Three months of a postdoctoral researcher's salary of $10,110 (who will help in laboratory analysis, molecular work, and conduct greenhouse and field trials with the PI). A technician who is already working in the lab will coordinate sample collection, microbial isolation, and maintain isolate collections; funding is requested for three months' salary in the amount of $7,900.

B. Fringe Benefits: 1) Postdoctoral Researcher's benefits calculated at 40% of salary: $10,110 x 40% = $4,044. 2) Staff benefits calculated at 50% of salary for technician: $7,900 X 50% = $3,950.
C. Non-expendable Capital Equipment – none.
D. Travel: Domestic travel will include funding for mileage, meals, and lodging during travel for project planning, sample collection, and presentation at meetings ($1,000).
E. All Other Direct Costs: Materials and supplies ($2,100) this include DNA extraction kit and PCR supplies ($600), growth media, agar plates, and chemicals ($400), and greenhouse supplies ($250), cost of sequencing and shipping ($450), and publication costs ($400).

For Administrative Use *Effective Dates*	***PROPOSAL BUDGET***		
PRINCIPAL INVESTIGATOR(S): Adesemoye, A.O., Wegulo, S., & Baenziger, P. S. *PROJECT TITLE: Developing new strategies for integrated management of root rot pathogens of wheat*			
PROPOSED BUDGET SUMMARY *See Narrative Below*		*FUNDS REQUESTED FOR FY2019*	*FY*
		Year 1	***Year 2***
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Postdoc (0.25FTE)		*10,110*	
3. Other Professionals Technician (0.2 FTE)		*7,900*	
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%, 40% or 50%		*7,994*	
2. Grad Student (Professionals Technician) @ 50% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT *($5,000 or more; more than 2 years use)*			
D. TRAVEL	*Domestic*	*1,000*	
	Foreign		
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		*2,100*	
F. TOTAL AMOUNT OF THIS REQUEST		*29,104*	
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.			

RESEARCH PROJECT PROPOSAL

Submitted to: Nebraska Wheat Board, Lincoln, Nebraska
Project Title: Determining the host status of different lesion nematode species found in Nebraska.
Type of Project: Research
New Project.
Total Amount Requested: $34,000
Project Duration: July 1, 2018 to June 30, 2019
Principal Investigator: Thomas Powers, Department of Plant Pathology, University of Nebraska-Lincoln Email: tpowers1@unl.edu
Co-Investigator: Timothy Todd, Department of Plant Pathology, Kansas State University-Manhattan, Kansas
Organizations: University of Nebraska-Lincoln -2200 Vine Street, Lincoln NE 68583-0861 Ph: 402-472-3171, Fax: 402-472-9323 and Kansas State University,- 1712 Claflin Road, 4024 Throckmorton PSC, Manhattan, KS 66506 Ph: 785-532-6176

Project Abstract: Our goal is to improve pest (nematode) management using effective, affordable, and environmentally-sound integrated pest management (IPM) approaches. Crop rotation and cover crops are practices that can reduce nematodes in wheat production. The same practices can also increase nematode numbers and reduce yield if used without an understanding of a nematodes reproductive capabilities. This proposal focuses on root-lesion nematodes (*Pratylenchus* spp.), which account for the largest proportion of nematode losses in corn and wheat. We will test in greenhouse trials, the reproductive capabilities of four different *Pratylenchus* species known to occur on wheat in Nebraska. These trials will include the principal rotational and cover crops for wheat in Nebraska. The results will lead to informed decisions about nematode management when *Pratylenchus* nematodes are found in a field used for wheat production.

Objectives and Anticipated Outcomes:
Objective 1. Increase nematode inoculum of four primary species of *Pratylenchus* known from wheat in Nebraska (*Pratylenchus neglectus*, *P. thornei*, *P. scribneri*, and *P.* lineage #5).

Objective 2. Determine host reproduction (or non-host status) of Nebraska *Pratylenchus* lineages on wheat, rotational crops, and major cover crops.

Objective 3. Design cropping strategies that minimize *Pratylenchus* reproduction. Field testing these strategies will be the subject of future projects.

Outcomes of Objective 1. It is known that *Pratylenchus* species are present in ~77% of wheat fields in the central Great Plains. A survey from Kansas estimated 8% of wheat acreage is at risk of economically significant losses due to high levels of this nematode (Todd et al. 2014). Our preliminary survey data from Nebraska and Kansas suggest that there is a regional and local geographic component to *Pratylenchus* species distribution in these states. These differences in nematode distribution may be due to temperature and moisture gradients in the states, or cropping history and other ecological factors such as soil texture. We will culture the difference species from across these regions in greenhouse experiments in order to test their ability to reproduce on various host plants.

Outcomes of Objective 2.

In greenhouse tests we will determine the ability of different *Pratylenchus* species to reproduce on rotational and cover crop hosts other than wheat. These plant species include alfalfa, soybeans, dry beans, corn, oats, turnips, radish, cereal rye, barley, sunflowers, and sorghum. *Pratylenchus* species can exhibit

broad host ranges; nevertheless, differences in both host range and pathogenic potential exist among species, as well as among isolates within species (Castillo and Vovlas 2007). Preliminary assessment of *Pratylenchus* populations collected from corn and wheat indicate that many populations can be distinguished based on host preferences (figure 1). It is this difference in host preferences that will allow us to make recommendations the will reduce the levels of *Pratylenchus* in problematic wheat fields.

Outcomes of Objective 3. A predictive strategy can be designed to reduce numbers of *Pratylenchus* in Nebraskan wheat fields. These can be tailored to fit the species of *Pratylenchus* in specific fields. The strategy may be as simple as substituting a rotational crop that is not a host or not planting a cover crop that allows the continuous presence of susceptible host. Validation of this strategy will be tested first in greenhouse studies, followed by small plot experiments at regional research centers.

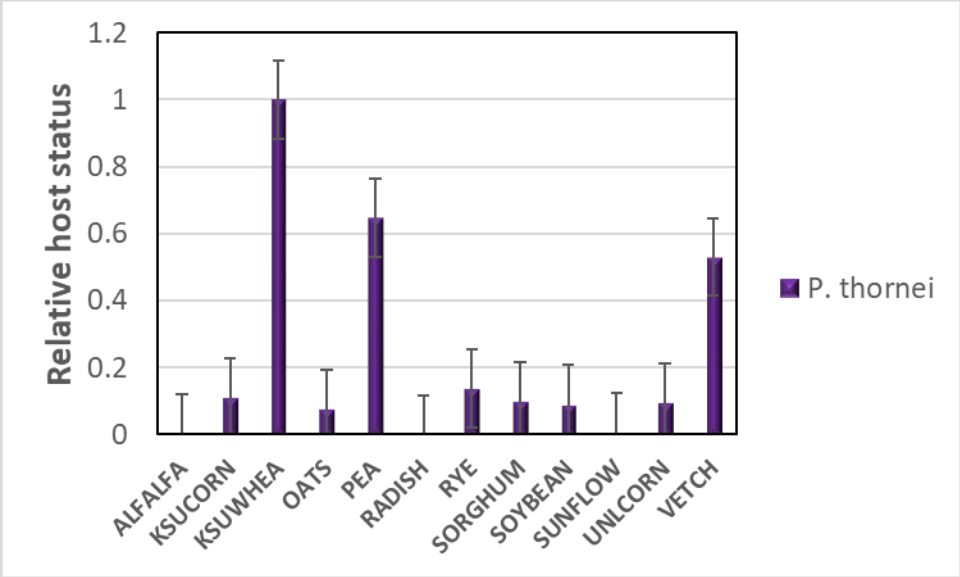


Figure 1. Results of a host trial using a Kansas population of *Pratylenchus thornei* from wheat, showing the relative reproduction on other plant species. For this nematode species, most plants other than pea and vetch will reduce numbers of lesion nematode.

Methods and Approach:

Host suitability studies: Host suitability studies at UNL will be directed by PI Todd using paired UNL-KSU experimental designs that are integrated with current testing in the KSU Plant Pathology greenhouses. Each lineage will be reared on a "differential" host set consisting of 10 plant species mentioned above. Two genotypes/varieties of each species will be included. The experimental design for each lineage trial will be a randomized complete block with three replications, and each trial will be conducted twice. Wheat will serve as the standard host in each case. Plants will be grown under controlled greenhouse conditions in 450 cm3 of pasteurized soil inoculated with 1,000 nematodes. Nematodes will be extracted from roots after eight weeks and quantified. Trials will focus on within and between lineage comparisons, using cultures initiated from collections made across Nebraska. Inoculum from field collections will be amplified by root-explant culture in the laboratory as well as greenhouse cultures in pots of winter wheat.

Implementation Plan: Improved understanding of *Pratylenchus* management is an expected outcome of this project. The proposed research uses DNA barcoding for reliable species/lineage level identification. There are three general outcomes anticipated from the evaluations of host status among rotational and

cover crops. Individual plant species will either display a non-host, marginal host, or good host response to specific *Pratylenchus* lineages. If the response is non-host or marginal host, then the plant will be monitored in future field trials as either rotational or cover crops in wheat production. Good hosts will not be recommended as rotational or cover crops for wheat fields containing the corresponding *Pratylenchus* lineage.

Dissemination: Information will be disseminated locally and regionally through grower meetings, specified field days, a NebGuide, websites, and more broadly through traditional scientific publications such as the Journal of Nematology. As a specific example, results will be used to update the existing Midwest Cover Crops Council Cover Crop Decision Tools website (http://www.mccc.msu.edu/selectorINTRO.html).

Relevance: In the central Great Plains, root-lesion nematodes are among the most prevalent plant-parasitic nematodes encountered in soils cropped to corn and wheat (Todd et al. 2014). Disease loss estimates for wheat in Kansas place lesion nematode second only to stripe rust over the past five years (Appel et al. 2015). Outside of the Great Plains region, lesion nematodes have been demonstrated to be important limiting factors in the production of spring wheat in Australia and Mexico, and both spring and winter wheat in the Pacific Northwest (Nicol et al. 1999, 2004; Smiley et al. 2005a, 2005b; Vanstone et al. 1998). The evidence for damage potential notwithstanding, the economic impact of RLN in winter wheat and corn in the central Great Plains (as in other regions), is easily overlooked (Jones et al., 2013). Most management recommendations are often based on incomplete or inaccurate information. Information on the host status of alternative crops (especially cover crops), is sparse and often contradictory.

Impact:

Production goals: Sustainable intensification of agricultural production is Goal 1 of the USDA Research, Education, and Economics Action Plan. Wheat as a specific crop focus of this proposal has broad regional and national relevance. Given the prevalence, importance, and differential feeding behavior of lesion nematode species, the results will benefit a broad range of crop production systems and geographic regions by improving the efficiency of available and environmentally-friendly integrated pest management strategies. The proposed research will provide important information, currently lacking, for Nebraska producers regarding comprehensive pest management decisions involving the advantages and disadvantages of rotational and cover crops for lesion nematode management. The technology necessary to characterize genetic identity at the molecular level is now well established. This proposal seeks to establish the linkage between molecularly recognized distinct species within *Pratylenchus* from Nebraska and their ability or inability to feed on plants grown in rotation with wheat or grown as cover crops in association with wheat.

Cover crops: Management practices such as crop rotation and use of cover crops are integral to the soil health management initiatives outlined by USDA NRCS (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/mgnt/). In a 2013-2014 survey, 75% of respondents reported growing cover crops in the past five years (SARE Cover Crop Survey Report). While increased soil organic matter was the primary desired benefit, diseases were listed as both a desired benefit and a concern. Suppression of pathogens and diseases is inherent in the concept of soil health, and crops such as *Brassica* spp. and sudangrass have been shown to be effective in reducing soilborne pathogens, including nematodes (Larkin 2015). Nevertheless, considerable uncertainty exists regarding optimal practices and components for specific cropping systems. The release of toxic pest-suppressing breakdown products (e.g. isothiocyanates) following the incorporation of glucosinolate-containing brassica cover crops (Snapp et al. 2005), for example, may be offset by a favorable host status for some

lesion nematode species (Potter et al. 1999; Taylor et al. 2000). Examination of the Midwest Cover Crops Council Cover Crop Decision Tools website (http://www.mccc.msu.edu/selectorINTRO.html) reveals that reliable information on disease/nematode responses is limited, often resulting in a range of opinions about potential advantages and disadvantages across states for a given cover crop.

Short to Long Term Impacts: Short term impacts include the development of a support database for improved diagnosis and management of lesion nematode in wheat. Database information will be applicable to other crops in the region, as many of the same rotation and cover crops used in wheat production overlap with corn and soybean production. Medium term impacts include more efficient implementation of cropping-system based IPM strategies. Long term impacts include reduced losses due to lesion nematode and increased production and profitability in agriculture.

Method suitability: Management options for lesion nematodes are limited and problematic. Effective soil-applied insecticide-nematicide products are nonexistent for wheat. Newer nematicidal/biological seed treatments (e.g. Avicta Complete) are available for corn but these products often provide inadequate lesion nematode control (Todd, unpubl.). Host resistance to lesion nematode is quantitative and partial, and has not been commercially developed for corn or wheat in the central Great Plains. The most viable management strategy is rotation with poor host and non-host crops, but this requires precise knowledge of species-level host preferences. The methods described in this proposal are an effort to provide the knowledge necessary for effectively implementation of these management strategies.

Timeline:

Spring, Summer 2018	Establish greenhouse colonies of nematodes, amplify nematode numbers in root-explant cultures, initiate rotational/cover crop plant cultures, extraction and inoculate plants in host trials, continue field collections to increase populations for future testing.
Fall-Winter 2018-2019	Analysis of reproductive capability, initiate greenhouse crop sequence trials to monitor changes in nematode populations, plan 2019 small plot trials.

Budget Narrative:

A. Salaries & Wages-
Research technologist – The research technologist at UNL will assist in all phases of field, laboratory and greenhouse work, soil sample collection, nematode extraction, isolation, examination, culture and DNA-barcoding.- $20,000.

B. Fringe Benefits- Research technologist @ 30% = $6,000.

E. All Other Direct Costs: Materials and supplies necessary to complete the proposed objectives such as pipette tips, microcentrifuge tubes, culture plates, antibiotics ($1,000), DNA barcoding costs ($6,000), greenhouse bench rental and autoclave fees ($1,000).

For Administrative Use *Effective Dates*	***PROPOSAL BUDGET***

PRINCIPAL INVESTIGATOR(S): Thomas Powers and Timothy Todd

PROJECT TITLE: Determining the host status of different lesion nematode species found in Nebraska

PROPOSED BUDGET SUMMARY *See Narrative Below*		*FUNDS REQUESTED FOR FY 19*	*FY*
		Year 1	***Year 2***
A. SALARIES AND WAGES *Commodity Board usually does not pay the cost for Project Investigators*			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals		*20,000*	
4. Prebaccalaureate Students			
5. Secretarial – Clerical			
6. Technical, Shop, Other			
7. Graduate Students			
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%, 40% or 50%		*6,000*	
2. Grad Student @ 38% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT *($5,000 or more; more than 2 years use)*			
D. TRAVEL	*Domestic*		
	Foreign		
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		*8,000*	
F. TOTAL AMOUNT OF THIS REQUEST		*34,000*	

INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
WEST CENTRAL RESEARCH & EXTENSION CENTER

April 13, 2018

Dear Mr. Royce Schaneman,
Executive Director, Nebraska Wheat Board.

Dear Sir:

Leveraging Statement: Proposal submitted to the Nebraska Wheat Board (NWB)

I have a revolving account that could leverage the funding that I may get from the Nebraska Wheat Board. However, the proposed study that I have submitted cannot be conducted if the proposal was not approved, i.e., if I didn't receive any funding from the Board.

Specific examples of how funds will be leveraged include:

1. Some of the materials needed for greenhouse studies will be provided from the revolving account.
2. The revolving account will pay part of the salary of the personnel that will conduct the proposed studies.

Thus, the funding of the NWB is essential for me to execute the proposed study.
I am grateful to the Nebraska Wheat Board (NWB) for the support that has been given to my research program in the previous years.

Sincerely,

Dr Anthony O. Adesemoye
Assistant Professor/Disease Management Specialist
University of Nebraska-Lincoln
Tel: 308-696-6708. Email: tony.adesemoye@unl.edu
Web: adesemoye.unl.edu

RESEARCH PROJECT PROPOSAL

Submitted to: Nebraska Wheat Board, Lincoln, Nebraska

Project Title: Improving Winter Wheat Varieties for Nebraska
Type of Project: Research
Renewal:
Total Amount Requested: **$130,000**
Project Duration: July 1, 2018 to June 30, 2019 (48th Year)

Principal Investigators: P.S. Baenziger (coordinator) 362D Plant Science Building, University of Nebraska, Lincoln, NE 68583-0915, Phone: (402) -472-1538, Fax: (402)-472-7904, pbaenziger1@unl.edu; Devin Rose, and Dipak K. Santra

Organization: Department of Agronomy and Horticulture, 202B Keim Hall, University of Nebraska, Lincoln, NE 68583-0915, (402-472-5132, Fax: (402)-472-7904, hsteffens4@unl.edu

Body of Project
Abstract:

Small grains remain a major crop throughout Nebraska, development of new cultivars with improved quality and genetics is important to ensuring Nebraska wheat producers remain competitive. Our objectives are to: 1) strengthen breeding programs with an emphasis on input efficiency, irrigated production, end-use quality, and disease resistance to enhance profitability, and 2) continue research on improving breeding efficiency. Specifically we will continue our efforts in: 1. genomic selection, 2. selecting tall, long coleoptile wheat varieties, 3. developing elite irrigated wheat, 4. identifying high yielding, broadly adapted lines with resistance to disease, insects, and herbicides 5. improving end-use quality and healthier grains. We identify the best germplasm and combine traits by crossing. Lines are selected from segregating populations using field, greenhouse, and laboratory tests, while expanding and diversifying our use of molecular markers. The best lines will be released as new varieties and serve as the basis for future hybrid wheat.

Using NWB funds to leverage other sources of funding: This project has a long history of using these funds to leverage additional funds within the University (equipment grants, graduate student support, travel grants) and outside the University (current funding includes grants from the BASF, Ardent Mills, US Wheat and Barley Scab Initiative, USDA-NIFA for hybrid wheat, American Malting Barley Association, and Brewers Association). The program also generates royalties and intellectual property that support the project and the Nebraska Wheat Board. None of this financial support would be possible without having the ongoing Wheat Board funding ensuring a strong breeding program. A note of concern is that federal grants (e.g. the USDA-NIFA grants) are dependent upon the Principal Investigator leading the research for the duration of the grant. As Dr. Baenziger approaches retirement, his opportunities for federal grants will become less.

Minimum amount of funding: $60,000. We were able to survive this year by taking on additional responsibilities and using the salary savings to support the project. This source of funding will most likely not be available next year and funding at $60,000 will force depletion of our reserves to a point where we will be reducing the program in 2019-2020 if less than full funding is awarded.

University of Nebraska Lincoln

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
PANHANDLE RESEARCH AND EXTENSION CENTER

April 12, 2018

Royce Schaneman, Executive Director
Nebraska Wheat Board
301 Centennial Mall South – 4th Floor
P.O. Box 94912
Lincoln, NE 68509

Royce,

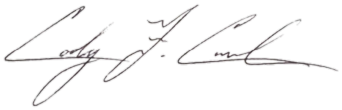
The Nebraska Wheat Board (NWB) has been a valuable partner in the Dryland Cropping Systems program and I acknowledge and thank the NWB for their past and continued support.

For the 18/19 fiscal year, I am the principle investigator on a previously funded proposal which was not funded last year. This year we are completing data collection and will continue the project on a limited basis in the coming year. I have been able to leverage NWB funding to increase overall support to fully cover the true cost of this project. A number of seed dealers donated seed, cooperators provided land, herbicide, and fertility inputs. Chemical companies donated product and supported wheat related research. Support is also received from the University of Nebraska for partial support of research technicians and equipment.

This year I have submitted three proposals for consideration by the NWB. The planting date project is a continuation of a funded project two years ago described in the previous paragraph. In addition, a new plot combine is being purchased and will be used primarily for wheat related research. Significant support has been received from UNL and industry partners but additional support is needed to purchase the combine. This new equipment has enabled us to pursue USDA funding on a 1 million dollar wheat research project led by myself with collaborators from UNL, KSU, WYO, and CSU. These projects could not be undertaken without support from the NWB and other sources. I will continue to do as I have with previous projects and leverage support from seed dealers, wheat producers, industry representatives, the University of Nebraska, and other grant opportunities similar to the USDA proposal mentioned earlier when they become available.

Again, I appreciate the opportunity to work with the NWB to serve the Nebraska wheat producer. If you have questions, please email ccreech2@unl.edu or call me at 308-632-1266.

Sincerely,



Dr. Cody Creech
Dryland Cropping Systems Specialist
Panhandle Research and Ext. Center

Title: Evaluation of feed wheat as a substitute for corn in diets containing distillers grains.
Type of Project: Research
New or Renewal: NEW
Total Amount Requested: $50,695
Project Duration: 12 months from July 1, 2018 to June 30, 2019. The cattle feeding portion will be approximately October, 2018 to May, 2019

Project Coordinator
Galen Erickson, Ph.D.
Cattle Industry Professor of Animal Science
Beef Feedlot Extension Specialist
University of Nebraska-Lincoln
C220 Animal Science; P. O. Box 830908
Lincoln, NE 68583-0908
PH: 402 472-6402
FAX: 402 472-6362
Email: gerickson4@unl.edu

Our proposed project is not being partially funded with other funds other than state supported positions (no other external grants). If a positive response is observed, then we would likely explore other funding options to address some metabolism, protein supplementation interaction, and other ways to improve use of feeding wheat grain to cattle. It is difficult to fund with other sources as feeding wheat is not prevalent except in certain locales and the beef industry cannot fund production oriented research with industry funds. We could explore research dollars from Kansas, but then we would likely need to compare steam-flaked wheat to steam-flaked corn to fit their situation and not Nebraska feeding situations. Unfortunately, beef nutrition trials are expensive so I don't know how to cut expenses unless we cut treatments from our proposed 6 diets, but then it still takes the same personnel for animal care/management and a graduate student time.

Leveraging Statement to support NE Wheat Board Research Project Proposal
Project Title: A Disease Management Tool for Stripe Rust of Wheat in Nebraska
Type of Project: Research
New or Renewal: New
Project Duration: July 1, 2018 to June 30, 2019. Year 1 of 2-year project
Total Amount Requested: $15,000
Principal Investigators:
Robert M. Harveson, Plant Pathologist, email: rharveson2@unl.edu, Phone: 308.632.1239; Dipak K. Santra, Alternative Crops Breeder, email: dsantra2@unl.edu, Phone: 308.632.1244; Panhandle Research and Extension Center, 4502 Avenue I, Scottsbluff, NE 69361, Fax: 308.632.1365
Organization:
University of Nebraska Lincoln, Panhandle Research and Extension Center, 4502 Avenue I Scottsbluff, NE 69361, Email: scruz3@unl.edu, Work Phone: 308.633.3802, Fax: 308.632.1365

Last year Dipak Santra and I submitted a proposal aimed at stripe rust and testing a new predictive concept for management. We proposed a study asking for $30,000 and to be conducted at 4 sites throughout western Nebraska (Scottsbluff (2), Hemingford (1), Sidney (1). This year we cut everything in half, proposing the same study with one dryland site at Sidney, and one irrigated at Scottsbluff, but asking $15,000 for the two sites. If need be, we would be willing to cut this to $10,000 but then would still have both dryland and irrigated plots but only at one location (Scottsbluff).

University of Nebraska Lincoln

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
DEPARTMENT OF AGRICULTURAL ECONOMICS

207A Filley Hall
Lincoln, NE 68583-0922
E: blubben2@unl.edu
P: 402-472-2235
March 14, 2018

Mr. Royce Schaneman
Nebraska Wheat Board Executive Director
301 Centennial Mall South, P.O. Box 94912
Lincoln, NE 68509

Dear Mr. Schaneman:

In response to the request for further information on our proposal to the Nebraska Wheat Board regarding how funding is being leveraged with other funding and what level of minimum funding is critical, I want to provide the following information.

Our proposal for "2018 Farm Bill Education in Nebraska" was submitted to the Nebraska Wheat Board as part of a joint proposal to the Nebraska Wheat Board, the Nebraska Corn Board, the Nebraska Soybean Board, and the Nebraska Grain Sorghum Board. The overall budget for the project of $61,310 covers the direct costs of an extensive plan for meetings, travel, and educational materials and none of the personnel time that will be dedicated to the project

The request of the Nebraska Wheat Board for $6,131represents 10% of the total funding request (NWB - 10%, NGSB - 10%, NCB - 40%, and NSB - 40%). As such, the proposal leverages NWB funding 9 to 1 with other requested funding from the major commodity boards in Nebraska and leverages the effort substantially more when recognizing the faculty commitment of time and effort to implement the proposed project.

If funding is limited from any or all of the requested sources, it will limit the extent of local programming for producers, landowners, and other agricultural professionals regarding farm bill programs and decisions in 2019. As all of the budget is committed to direct costs for meetings, travel, and materials, any reduction in funding will affect the effort in general proportional scale, with fewer educational meetings likely as a result.

Sincerely,

Bradley D. Lubben
Extension Associate Professor, Policy Specialist, and
Director, North Central Extension Risk Management Education Center

Project Title: Improving Nitrogen Management in Dryland Winter Wheat Production
Type of Project: Wheat Production Research
Project Year/Time Period: New proposal. July 1, 2018-June 30, 2021. Year 1 of 3-year project
Total Amount Requested: $15,000
Principal Investigators:
Bijesh Maharjan, Panhandle Research & Extension Center, 4502 Avenue I, Scottsbluff, NE 69361, PH: 308-632-1372, bmaharjan@unl.edu;
Cody Creech, Panhandle Research & Extension Center, 308-632-1266, ccreech2@unl.edu;
Dipak K. Santra, Panhandle Research & Extension Center, 308-632-1244, dsantra2@unl.edu;

Total amount requested for the proposed project is $15,000 each year for three years. In my last year proposal on the same topic, I asked for 30,000 each year. I halved the amount this year for similar amount of work with consideration for limited board budget. I planned to make up for the reduced fund by devoting numbers of hours from my technician and graduate student in establishing and maintaining the proposed field trial. I have teamed up with other specialists at UNL and have received their commitment on using some of their technicians help for this project. Minimal to no money from this project will go towards their salaries. The trial is planned at three different locations. Expenses for travel, supplies and lab analysis will be covered from the project fund.

We intend to take advantage of all already available resources at UNL, particularly at Panhandle research and extension center. The no-till drill, partially funded by the Wheat Board in 2015, will be used to plant the trials next to Wheat Variety Trials (also partially funded by the Wheat Board), when possible, for most economic use of the Board's investment to the University.

As I started in this position of soil and nutrient management specialist in September 2016, I learnt about this significant issue of low protein in wheat bushels that year and in 2017. This is an important research topic and I get many questions from producers on this topic. Without slashing on number of trials, I do not see how I can cut down on budget, which is already a bare minimum request. With findings of this project, I intend to go after a bigger state/federal grant to further investigate soil fertility issues related to wheat production in the region.

Please feel free to contact me if you have any questions.

April 12, 2018

Royce Schaneman
Executive Director
Nebraska Wheat Board
301 Centennial Mall S.
P.O. Box 94912
Lincoln, NE 68509

RE: Leveraging of Nebraska Wheat Board Grant Funds

Mr. Schaneman,

Husker Genetics has received grant funding from the Nebraska Wheat for different projects related to seed increases and varietal testing. The grant received from this past fiscal year is for seed increases in Yuma, AZ.

Husker Genetics leverages the Board Funds with royalty income to commercialize and market varieties to the Nebraska Small Grains Industry. Utilizing seed production in Yuma maximizes the yield and quality to advance lines faster from significantly smaller amounts of breeder seed.

Future funds will be leverage with royalty and seed sales income to continue to generate new varieties that benefit the Nebraska Small Grains Industry and Nebraska Stakeholders.

Respectively,

Jeff Noel
Director, Husker Genetics
University of Nebraska-Lincoln
1071 County Road G, Room C
Ithaca, NE 68033

Leverage of Funding - Nebraska Wheat Board Proposal, 2018

Submitted to: Nebraska Wheat Board, Lincoln, Nebraska

Project Title: Determining the host status of different lesion nematode species found in Nebraska

Type of Project: Research

Principal Investigator: Thomas Powers, Department of Plant Pathology, University of Nebraska-Lincoln
Email: tpowers1@unl.edu

Co-Investigator: Timothy Todd, Department of Plant Pathology, Kansas State University-Manhattan, Kansas

Objectives: This project has three straightforward objectives all related to nematode reproduction on wheat and potential crops grown in rotation with wheat.

1. In laboratory and greenhouse cultures, increase nematode inoculum of four primary species of *Pratylenchus* known from wheat in Nebraska (*Pratylenchus neglectus*, *P. thornei*, *P*. *scribneri*, and *P*. lineage #5).

2. In greenhouse trials, determine host reproduction (or non-host status) of Nebraska *Pratylenchus* lineages on wheat, rotational crops, and major cover crops.

3. Design cropping strategies that minimize *Pratylenchus* reproduction. Field-testing these strategies will be the subject of future projects.

Leverage of funding: In addition to the respective commodity funding opportunities in the states of Nebraska and Kansas**,** we will submit proposals to two USDA-NIFA Programs. These programs, Crop Protection and Pest Management and the AFRI Foundational and Applied Science Program for Pests and Beneficial Species, both support studies relating to nematode management. An additional form of leveraging could be achieved through our participation in the USDA Multistate Project W4186: Variability, Adaptation, and Management of Nematodes Impacting Crop Production and Trade. The objectives of the Multistate Project directly address management strategies for plant-parasitic nematodes. The ARD Research Division at UNL has in the past supplied funds to help achieve the goals of Multistate Programs.

Partial Funding: All of the requested funds relate to the determination of nematode reproduction on wheat and associated plants. A reduction of scale could result in reduced costs. Instead of analyzing four species of lesion nematode, we could focus on the three most widespread species in the region, *Pratylenchus neglectus, P. scribneri,* and *P. thornei*. A further reduction could be obtained by reducing the number of alternative plant hosts to be tested in greenhouse trials. With fewer plant species to test in the trials, there would also be a savings of DNA barcoding tests that confirm species identity at the conclusion of the trials.

Salaries, Wages & Benefits of Research technologist – $26,000 is requested for the research technologist that would conduct the culturing and nematode host-testing in UNL greenhouses. A reduction in scale could reduce costs by $6,000.

Other Direct Costs: Materials and supplies necessary to complete the proposed objectives such as pipette tips, microcentrifuge tubes, culture plates, antibiotics ($1,000), DNA barcoding costs ($6,000), greenhouse bench rental and autoclave fees($1,000). A reduction in scale could reduce costs by $2,000. Collective these reductions would reduce the total amount of the request to $26, 000.

Wheat Board Project 2018 – Dipak Santra

"Improving Proso Millet Varieties for Nebraska"

How the primary investigator (PI) is using NWB funds to leverage other sources of funding for these research proposals and if the project is partially funded, what would be the absolute minimum amount of funding the PI needs to complete a quality project?

This project is to support partially the proso millet breeding program focusing on developing proso millet varieties for traditional bird feed and alternative uses (e.g. human food and beverages). **Objectives are to:** (1) evaluate proso millet germplasm for traits necessary to improve proso millet varieties for Nebraska, and (2) use new lines in crossing. This project focuses on developing proso millet varieties for traditional bird feed and alternative uses.

Currently, I have a graduate student who is supported by proso millet seed industry (Dryland Genetics LLC). Under reduced funding, I will replace summer help by the graduate student for this project. Therefore, I would request minimum of $10,000 to accomplish the project's objective. I have removed summer help's salary & benefit and reduced travel & supplies.

Category	**Amount**
Technician's salary (1.85 person month)	$5,234.00
Fringe benefit	$2,618.00
Travel	$1,000.00
Oper & Suppl	$1,148.00
Total	**$10,000.00**

Proso millet breeding project was funded by NWB in FY'15 and FY'17 (50% of requested budget). As in the past, the requested budget ($20,000) is not sufficient to support everything of the proso millet breeding project. Therefore, I have been using NWB funds to leverage other funds for proso millet breeding projects. In the past, I have used personnel (technicians and summer students) and necessary recourses (machinery, travel, seed, etc.) supported by other funding sources (industry incomes from seed companies of proso millet, sunflower, and pea) for proso millet project. I will continue using such resources when possible and necessary to accomplish the projects objectives with the limited funding from the Nebraska Wheat Board.

Support from Nebraska Wheat Board for Proso Millet Breeding played important role in millet breeding in Nebraska. I like to continue the same with your some support.

Title of Project: Mitigating Winter Wheat Losses Caused by Diseases
Type of Project: Research
New or Renewal: Renewal
Total Amount Requested: $34,700
Project Duration: July 1, 2018 to June 30, 2019
Project Coordinator Name, Address, Phone, Fax, and E-mail:
Stephen Wegulo, Professor/Extension Plant Pathologist, University of Nebraska-Lincoln, 406H Plant Sciences Hall (1875 North 38th Street), Lincoln, NE 68583-0722; Phone: 402-472-8735; Fax: 402-472-2853; Email: swegulo2@unl.edu

Organization Name, Address, Phone, Fax, and E-mail:
University of Nebraska-Lincoln, Agricultural Research Division, 207 Ag Hall, Lincoln, NE 68583-0704; Phone: 402-472-2045; Fax: 402-472-9071; E-mail: ardgrants@unl.edu
Additional Participating Institutions: None

Project Abstract:
Wheat lines in the small grains breeding program will be screened for resistance to stem rust, leaf rust, and Fusarium head blight (FHB, scab) in the greenhouse and field. Rust screening will involve planting the lines in the greenhouse, spray-inoculating them with rust spores, incubating the plants under prescribed environmental conditions, and rating disease reaction at the seedling stage. FHB screening will involve inoculating greenhouse- and field-grown lines at anthesis with *Fusarium graminearum* spores and rating disease severity 18 to 21 days after inoculation. Research on integrated management of FHB will be conducted in the field by timing fungicide application at anthesis to wheat cultivars differing in resistance and measuring disease index, *Fusarium*-damaged kernels (FDK), yield, and vomitoxin (DON). Statewide wheat disease surveys will be conducted to identify major diseases occurring in growers' fields. Management recommendations will be provided to growers based on the survey results.

Using Nebraska Wheat Board Funds to Leverage Funds From Other Sources:
Diseases are one of the major constraints to wheat production, second only to agronomic characteristics introgressed into new varieties through breeding. As part of an ongoing effort to effectively manage wheat diseases, my program screens wheat lines for the small grains breeding program for resistance to Fusarium head blight (FHB), stem rust, and leaf rust. Together with UNL's small grains breeder Dr. P. Stephen Baenziger, we have successfully competed for United States Wheat and Barley Scab Initiative (USWBSI) funding, which together with funding from the Nebraska Wheat Board (NWB) has enabled us to screen 3,000 to 4,500 wheat lines per year. I have also, in my own program, successfully competed for modest USWBSI funding which I have combined with funding from the NWB to conduct research on integrated management of FHB. This research has yielded results that can help Nebraska wheat growers to more effectively manage FHB. Currently, I am a major adviser of a Ph.D. student, Mr. Carlos Bolanos-Carriel, whose tuition and stipend are funded by a scholarship from his government of Ecuador. He is working on integrated management of FHB and I am very grateful that this work is possible in part due to the NWB whose funding I have used to buy materials and supplies needed for field, greenhouse, and lab research. Statewide wheat disease surveys are critical in the dissemination of information on the current status of diseases in wheat fields so growers can plan to apply timely management tactics to minimize losses caused by diseases. There are no state or federal competitive grants that support wheat disease surveys. I use NWB funding to leverage industry funding that I receive to conduct fungicide efficacy trials to make statewide wheat disease surveys possible. This year I have been informed by my major industry source of funding, Arysta LifeScience, that the company does not have wheat fungicide trials for me to conduct in 2018. This will significantly reduce the amount of industry funding I will have that will be leveraged by NWB funding for wheat disease surveys. Optimally, I have requested $34,700 from the NWB. If only partial funding of this requested amount is available, I am requesting $25,000 at a minimum to enable me complete the wheat projects I have in fiscal year July 1, 2018 to June 30, 2019.

RESEARCH PROJECT PROPOSAL

Submitted to: Nebraska Wheat Board, Lincoln, Nebraska
Title of Project: Developing High Quality Nebraska Wheat for Domestic and International Markets
Type of Project: Research
New or Renewal: Renewal
Total Amount Requested: $50,000.00
Project Duration: July 1, 2018 to June 30, 2019 (48th year)

Principal Investigators: PI: Lan Xu, Department of Agronomy and Horticulture, 177 Keim Hall, University of Nebraska-Lincoln, Phone 402-472-6243, Fax 402-472-7904, lxu4@unl,edu
Co-PI: Devin Rose, Department of Food Science & Technology, FIC 1901 N 21st St Rm 268, University of Nebraska-Lincoln, Phone 402-472-2802, Fax 402-472-7902, drose3@unl.edu.
Co-PI: Stephen Baenziger, Department of Agronomy and Horticulture, 362D Plant Science Hall, University of Nebraska-Lincoln, Phone 402-472-1538, Fax 402-472-7904, pbaenziger1@unl.edu

Organization: Department of Agronomy and Horticulture, 279 Plant Science Hall, University of Nebraska-Lincoln, Phone (402-472-5132, Fax (402)-472-7904, hsteffens4@unl.edu

Project Abstract:

Nebraska wheats have a long-standing reputation for superior quality in the milling and baking industries. In addition, there is an emerging market for high quality tortilla and noodle as well whole wheat bread from Nebraska wheat. Identification of superior quality characteristics is essential to keep Nebraska wheat competitive. Wheat Quality Laboratory (WQL) at UNL plays an important role in this process through end-use quality evaluation of early to later generation wheat from UNL wheat breeding program (WBP) and other sources. Analyses include kernel variability, sprouting damage, milling performance, ash, protein and dietary fiber contents, polyphenol oxidase activity, starch viscosity, protein and carbohydrate compositions, dough rheology, and final product quality such as bread, noodle and tortilla. Our results are used by the WBP for wheat advancement to release varieties with excellent end-use quality. Furthermore, with new genomic tools available these data may be used for prediction of wheat quality throughout the WBP.

Nebraska Wheat Board Funds to Leverage Other Funding Sources:

Nebraska Wheat Board (NWB) funding is the major source of financial support to the WQL at UNL and is crucial to the mission of the WQL, which is to perform end-use quality analyses on early generation and late generation wheat varieties in the WBP in order to ensure release of sustainable high-quality Nebraska wheat, and keep Nebraska wheat competitiveness domestically and internationally in traditional and new health food markets. Wheat quality tests require extensive labor, materials, regents, and chemicals, while the equipment and instruments require maintenance for proper function. Unfortunately, there are no national or state competitive funds for wheat quality research; however, funds obtained from related external grants are leveraged to create royalty bearing varieties that support the WBP. In addition they supplement leveraged funds on parent development for the NIFA-IWYP grant, the USWBSI grant, and our collaborations with many companies that often involve in-kind exchanges of valuable germplasm. Furthermore, funds from the NWB are leveraged with Hatch Act state funds as well as those generated from Extension programs. Funding from the NWB is essential and gratefully acknowledged to maintain operation of the WQL at UNL.