

NEBRASKA DRY BEAN COMMISSION



ANNUAL REPORT

Fiscal Year 2013 – 2014

Nebraskadrybean.com

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**NEBRASKA DRY BEAN COMMISSION MEMBERS
AS OF JULY 2013**

PROCESSOR REPRESENTATIVES

Nolan Berry New Alliance Bean	P.O. Box 462 Gering, NE 69341 (308)436-5849	Term – Second May 30, 2011 May 30, 2014
Courtney Schuler Stateline Producers Cooperative	801 Railroad Gering, NE 69341 (308)436-2186	Term – Second May 30, 2013 May 30, 2016
Brian Kaman Kelley Bean Company	1520 Ave B Scottsbluff, NE 69361 (308)635-2338	Term – First May 30, 2012 May 30, 2015

GROWER REPRESENTATIVES

Steven Benzel District I	6180 Otoe Road Alliance, NE 69301 (308)762-8852	Term – Second May 30, 2011 May 30, 2014
Wes Ullrich District II	60287 Sunflower Road Mitchell, NE 69357 (308)641-2772	Term – Second May 30, 2012 May 30, 2015
Craig Henkel District III (resigned Jan. 2014)	7326 Road 110 Bayard, NE 69334 (308) 631-5221	Term – Second May 30, 2012 January 2014
Cindi Allen District IV	450 Road East 60 Ogallala, NE 69153 (308)284-4980	Term – Second May 30, 2013 May 30, 2016
Rodney Loose At-Large Dist I & II	170478 County Road C Mitchell, NE 69357 (308)623-2002	Term – First May 30, 2011 May 30, 2014
Ex Officio – Gary Hergert, Interim Director Panhandle Research & Extension Center 4502 Ave I (308) 632-1254		Lynn Reuter, Office 4502 Ave I Scottsbluff, NE 69361 (308) 632-1258

**Nebraska Dry Bean Commission
Working Committees
FY 2013-2014**

EXECUTIVE COMMITTEE

Wes Ullrich – Chariman
Cindi Allen – Vice Chairman
Steve Benzel – Treasurer

FEDERAL ISSUES COMMITTEE

Wes Ullrich	Brian Kaman
Cindi Allen	Rodney Loose

PROMOTIONS COMMITTEE

Cindi Allen	Craig Henkel
Nolan Berry	Courtney Schuler

GROWERS RELATIONS COMMITTEE

Steve Benzel	Wes Ullrich
Rodney Loose	Craig Henkel

PROCESSOR RELATIONS COMMITTEE

Nolan Berry	Brian Kaman
Craig Henkel	Rodney Loose
Courtney Schuler	

RESEARCH COMMITTEE

Nolan Berry	Brian Kaman
Cindi Allen	Courtney Schuler
Craig Henkel	Rodney Loose
Steve Benzel	

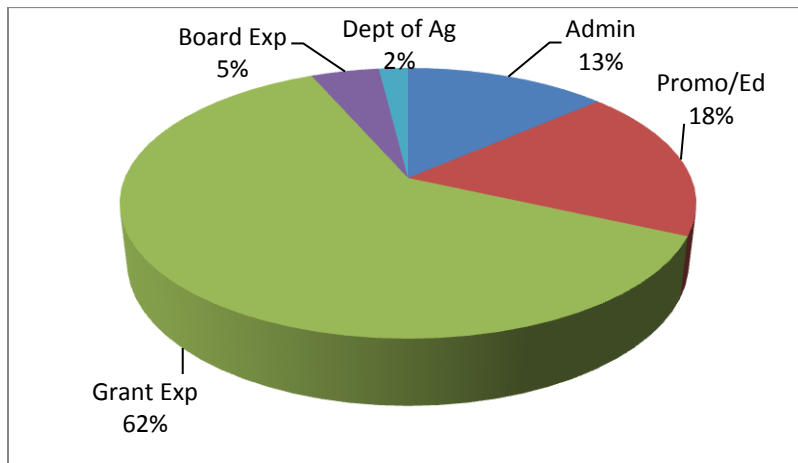
NEBRASKA DRY BEAN COMMISSION HISTORY

The Nebraska Dry Bean Commission was established in 1987, following the grass-roots efforts driven by Nebraska dry bean growers and processors seeking to advance the dry bean industry in the State of Nebraska. Since 1987, the Nebraska Dry Bean Commission has been committed to helping the states dry bean producers and processors advance the dry bean industry through research, international and domestic promotion, publicity and education. The Board is responsible for investing check-off funds in appropriate programs.

The Nebraska Dry Bean Commission looks for opportunities to increase the consumption of dry beans, educate the consumer about the health benefits of dry beans and continue to fund research aligned with the goals of the Commission.

**NEBRASKA DRY BEAN COMMISSION
FISCAL REPORT
JULY 1, 2013-JUNE 30, 2014**

	FY 13-14 Budget	Total Expenses
Beginning Cash Balance	\$103,625.90	\$103,625.90
Revenue		
Dry Bean Fees	\$283,400.00	\$289,607.15
Investment Interest	\$ 2,800.00	\$ 1,798.55
Reimbursements	<u>\$ 0.00</u>	<u>\$ 3,091.66</u>
Total Revenue	\$286,200.00	\$294,497.36
Refund Program		
Grower Refund Expense	\$ 8,000.00	\$ 4,439.74
Processor Refund Expense	<u>\$ 1,000.00</u>	<u>\$ 1,000.00</u>
Total Refund Expense	\$ 9,000.00	\$ 4,439.74
Total Available Cash	\$380,825.90	\$393,683.52
EXPENDITURES		
Administration	\$ 50,888.00	\$ 46,046.81
Promotion/Education	\$ 65,000.00	\$ 61,669.41
Grant Expense	\$207,415.67	\$209,242.34
Board Expense	\$ 16,500.00	\$ 15,526.36
Dept of Ag Contract	<u>\$ 8,415.00</u>	<u>\$ 6,641.43</u>
Total Expenditures	\$348,218.67	\$339,126.35



2013 NEBRASKA DRY BEAN PRODUCTION

Production Facts

In 2013, Nebraska ranks third nationally in commercial dry bean production, accounting for 11% of the US dry bean crop.

- In 2013, Nebraska harvested 2.750 million cwt of dry beans valued at \$117,700,000.00 from 117,000 acres.
- Nebraska is the number one producer of great northern beans, second in production of pinto and light red kidney beans.
- Yields in 2013 averaged 2,350 pounds per acre for the major market classes of dry beans grown in Nebraska.
- In 2013, Nebraska dry bean production consisted of the following market classes: 45% great northern, 43% pinto, 7% light red kidney, 3% black and 2% other.

2013 Nebraska Dry Bean Exports

Great Northerns 2013 Crop

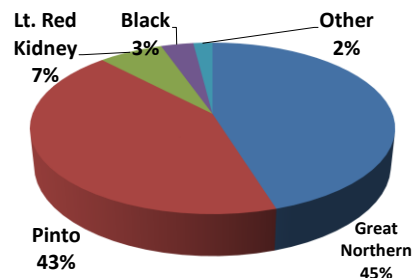
US Production 1,515,000 cwt (NE production 1,243,000 cwt – 82% of National production including seed) Exports 778,955 cwt % of Crop Exported 51.55%

Pinto Beans 2013 Crop

US Production 8,486,000 cwt (NE production 1,174,000 cwt – 14% of National production including seed) Exports 1,272,815 cwt Crop Exported 15%

Pinto Bean exports due to demand for good color beans into our major export markets, which are color sensitive, such as Mexico, Dominican Republic and Angola. (Source USDA Final 2013 Crop and GATS Export Data)

2013 Nebraska Dry Bean Production By Market Class



Nebraska Dry Bean Commission
 FY 13-14 Approved Research Contracts

DB2013-01	Increasing the production efficiency and market value of dry edible beans through a collaborative, integrated research and extension program at the Panhandle Research and Extension Center (Dr. Boeckner)	\$25,000.00
DB2013-02	Breeding great northern, pinto, small red, black, large red kidney, cranberry and yellow beans for multiple disease resistance with high performance in western Nebraska (Urrea)	\$59,000.00
DB2013-03	Evaluation of dry bean cultivars for performance in Western Nebraska (Schild, Urrea)	\$ 9,500.00
DB2013-04	Monitoring bean pathogen variation and screening breeding lines with Relevant pathogen races/isolates for multiple disease resistance (Steadman, Urrea, Schild, Harveson, Jhala)	\$ 8,075.00
DB2013-05	Improving dry edible bean utilization in the food industry: Developing New ingredients and products from milled and separated fractions of Great Northern beans (Ratnayake, Rose)	\$35,984.00
DB2013-06	In-vitro testing of new alternative chemicals for suppressing bacterial Plant pathogens (Harveson)	\$ 2,500.00
DB2013-07	Identification of highly regenerative and agrobacterium susceptible Common bean cultivars for molecular breeding (Mitra, Clemente)	\$20,000.00
	Total Funding	\$160,059.00
	Planter Agreement	\$ 4,826.67
DB2012-08	Identifying sources and mapping genes for bacterial wilt resistance And mapping for resistance genes (Urrea)	\$ 6,000.00
DB2012-09	Incorporating dry edible beans into noodles to improve product Nutrition value phase II extension (Ratnayke)	\$ 7,500.00
	Total Funding	\$178,385.67

FY 13-14 Contracts

INTER-AGENCY AGREEMENT

This Agreement is made and entered into this 22 day of January, 2010 by **THE PANHANDLE RESEARCH AND EXTENSION CENTER**, University of Nebraska-Lincoln ("PHREC") and the **NEBRASKA DRY BEAN COMMISSION** ("NDBC") whose address is 4502 Ave I, Scottsbluff, NE 69361. PHREC and NDBC are both agencies of the State of Nebraska.

PHREC and NDBC hereby agree as follows:

1. **PREMISES** - PHREC hereby rents to NDBC, the below described premises (herein called "**Premises**") for use as professional office space: Elliott Building Room 107A approximately 192 net usable square feet.

2. **TERM** - The initial Term of this Agreement shall commence on July 1, 2009, and shall continue on a month to month basis until either party gives sixty (60) days written notice to the other party.

3. **RENTAL** - NDBC shall pay PHREC \$1100 per fiscal year July 1, 2009 – June 30, 2014. Any future rate increases will be communicated in writing at least sixty (60) days prior to effective date. Rental shall be billed by and paid to PHREC by internal charge document.

4. **TERMINATION** - PHREC and NDBC shall have the right to terminate this Agreement upon giving a sixty (60) day notice of such termination in writing.

5. **NOTICES** - All notices herein provided to be given, or which may be given, by either party to the other, shall be deemed to have been fully given when made in writing and deposited in the United States mail, postage prepaid, and addressed as follows:

PHREC at: Karen Schultz
Panhandle Research & Extension Center
4502 Avenue I
Scottsbluff NE 69361

With copy to: Linda Cowdin
UNL Property Management
1901 Y Street
Lincoln, NE 68588-0605

NDBC at: Lynn Reuter
Nebraska Dry Bean Commission
4502 Avenue I
Scottsbluff, NE 69361

With copy to: _____

6. **ASSIGNMENT AND SUBLETTING** - NDBC shall not assign this Agreement.

7. **INSPECTION** - NDBC agrees to permit PHREC and/or its authorized representative to enter the Premises at all reasonable times during usual business hours for the purpose of inspecting the same, or for the making of any necessary repairs for which PHREC is responsible or feels necessary for the safety and preservation of the Premises.

8. **SIGNAGE, FIXTURES AND PERSONAL PROPERTY** - All signage must be approved in advance by PHREC and follow University Sign Guidelines. Any trade fixtures, equipment, personal property or signage installed in or attached to the Premises by or at the expense of NDBC, shall be and remain the property of NDBC. PHREC agrees that NDBC shall have the right to remove any and all of its personal property, trade fixtures, equipment and signage. Equipment and other personal property which may have been stored or installed by or at the expense of PHREC shall be and remain the property of PHREC. NDBC agrees that it will, at its expense repair any damage occasioned to the Premises by reason of the removal of its trade fixtures, equipment, signage and other personal property.

9. **ALTERATIONS** - NDBC acknowledges that the Premises are rented in good condition. NDBC will not permit any alterations of or additions to any part of the Premises, except by written consent of PHREC, which consent shall not be unreasonably withheld, and all alterations and additions to the Premises shall remain for the benefit of PHREC unless otherwise provided in said consent. NDBC hereby indemnifies PHREC against liens, costs, damages and expenses with respect to any such additions or alterations.

10. **RETURN OF PREMISES** - At the conclusion or termination of this Agreement or any extension thereof, NDBC shall return the Premises to PHREC in the same condition as it was received at commencement of this Agreement, normal wear and tear accepted. If at the conclusion or termination of this Agreement or any extension thereof, PHREC is of the opinion that NDBC is not leaving the Premises in the same condition as it was received, normal wear and tear accepted, then such costs of restoration will be determined by a panel of three (3) persons consisting of NDBC, PHREC and one (1) person selected by mutual consent of both parties.

11. **DESTRUCTION OF PREMISES** - Should said Premises be made unfit for occupancy due to fire, unavoidable casualty, or Act of God, said tenancy shall immediately terminate and NDBC shall pay rent only to the time of such termination. The portion of any advance rental payment which is attributed to the period of time after the Agreement has been terminated in the above manner shall be refunded by PHREC to NDBC. If the damage is not of a permanent nature, PHREC shall be responsible for repairing the same in a timely manner at PHREC's own expense and the rental payments shall be suspended until said Premises have been put in proper condition for occupancy.

12. **REPAIR AND MAINTENANCE** - During the Agreement term, PHREC shall provide HVAC and electrical services, basic janitorial services, and maintain the general landscaping, sidewalks and parking areas; the roof, exterior walls, exterior doors, exterior windows and the corridors of the building; and the building equipment in good repair and tenable condition. PHREC's obligations include, but are not limited to, the maintenance and repair of the plumbing, heating electrical, air-conditioning and ventilating equipment and fixtures to the end that all such facilities are kept in good operative condition except in case of damage arising from a willful or negligent act of NDBC's agent, invitee, or employee. NDBC's obligations include, but are not limited to, the maintenance and repair of all other equipment and fixtures in the Premises.

13. **SERVICES AND UTILITIES** - PHREC will provide heating, cooling, and lighting as well as a network connection in the office space occupied by NDBC. NDBC will arrange and pay for telephone service for the premises. It is the responsibility of PHREC to insure that adequate entrance cables are provided by the local telephone company for the services required.

14. **GENERAL PROVISIONS** - If the whole of the Premises or a substantial part of the Premises shall be required for PHREC's public use or purpose, the terms of this Agreement shall end upon and not before the date when possession of the part so taken shall be required for such use or purchase, and without apportionment of the award, and current rent shall be apportioned to the date of termination.

15. **COMPLIANCE WITH LAW** - NDBC shall comply with all building and use or occupancy restrictions, conditions and covenants of record. NDBC shall comply with the requirements of all policies of public liability, fire and other insurance at any time in force with respect to the Premises. This space shall meet all current code requirements, including but not limited to, fire/life safety codes and the Americans with Disabilities Act Accessibility Guidelines.

16. **DEFAULT** - If default shall be made in any of the covenants or agreements of NDBC contained in this document, or in case of any assignment or transfer of this Agreement by operation of law, PHREC may, at its option, terminate this Agreement by serving ten (10) days' notice in writing upon NDBC. Any waiver by PHREC of any default or defaults shall not constitute a waiver of the right to terminate this Agreement for any subsequent default or defaults, nor shall any such waiver in any way affect PHREC's ability to enforce any section of this Agreement. The remedy set forth in this section shall be in addition to, and not in limitation of, any other remedies that PHREC may have at law or in equity.

17. **INSURANCE** - NDBC agrees to insure its own personal property and maintain liability insurance and accordingly waives any and all claims against PHREC for loss or damage of any type unless such loss is the result of a negligent act or omission of PHREC, its agents or employees. PHREC agrees to insure the Premises for loss or damage unless such loss is the result of negligent act or omission of NDBC, its agents or employees.

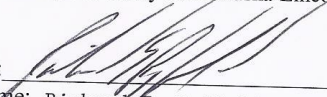
18. **TAXES** - The Premises are tax exempt. If the Premises become subject to real property tax by reason of this Agreement, NDBC shall be responsible to pay such tax.

19. **MODIFICATION OF AGREEMENT** - Any modification of this Agreement or additional obligation assumed by either party in connection with this Agreement shall be binding only if evidenced in a writing signed by each party or an authorized representative of each party.

[Remainder of page intentionally left blank; signature page to follow]

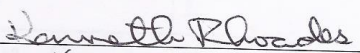
IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the date first above written.

FOR THE
PANHANDLE RESEARCH AND EXTENSION
CENTER, University of Nebraska-Lincoln

By: 
Name: Richard E. Byfield
Its: Director, FPC

Date: 1-22-10

NEBRASKA DRY BEAN COMMISSION

By: 
Name: Kenneth Rhoades
Its: Chairman

Date: 1-11-2010

64457

AGREEMENT
between
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
and
NEBRASKA DRY BEAN COMMISSION

CONTRACT NUMBER: DB 2013-01

PROJECT TITLE: Increasing the Production Efficiency and Market Value of Dry Edible Beans Through a Collaborative, Integrated Program at the Panhandle Research and Extension Center.

PROJECT INVESTIGATORS:

1. Insect resistance for dry beans (Bradshaw, Urrea).
2. New alternative chemical products for managing bacterial diseases in dry beans (Harveson).
3. Fertilizer and Soil Management for Dry Bean Production (Hergert).
4. Iron content of Nebraska elite dry bean germplasm (Urrea/Schild).
5. Developing Season long deficit irrigation strategies for dry bean production (Harveson/Reichert).

This Agreement, entered into by and between the Board of Regents of the University of Nebraska, hereinafter called the "University" and the Nebraska Dry Bean Commission, hereinafter called the "Commission", is made this 26th day of June, 2013. Said parties agree that the University will perform the work set in the proposal of DB 2013-01, attached, and that the Commission agrees to pay the University the total sum not to exceed \$25,000.00.

PERFORMANCE SCHEDULE:

Performance of the work set out in the proposal for DB 2013-01 will occur during the period of July 1, 2013 through June 30, 2014.

ALLOWABLE COSTS:

The total cost of performance of the contract is not to exceed \$25,000.00

METHOD OF PAYMENT:

Actual cost incurred not to exceed \$25,000.00. An advanced payment may be requested by the University for obligations incurred related to this project for the first six months work by submission of an Interagency Billing Transaction (IBT). A final payment will be made upon completion of the project for obligations incurred and invoiced on an IBT. In the event the Commission's funds available are insufficient at any time to enable the Commission to pay aforesaid agreed compensation, due to insufficient receipts from the dry edible bean check-off funds, the Commission giving the University a 60-day written notification of amount of such reduction may reduce the amount of aforesaid "payment" at any time.

ACCOUNTING EXPENDITURE REPORTS:

The University shall provide a semi-annual statement of actual expenses incurred through December 31st and at the conclusion of the project. Any unexpended balance shall be refunded within 90 days or the termination of the project.

SPECIAL PROVISIONS:

The parties mutually agree as follows:

a. The University shall:

- (1) Not discriminate against recipients of services on the basis of race, color, religion, national origin, sex, disability, or age; and
- (2) Not discriminate against any employee or applicant for employment on the basis of race, color, religion, national origin, sex, or qualified disability.

It is further understood and agreed that, if the University is in violation of this clause, it shall be barred forthwith from receiving further funds, unless a satisfactory showing is made indicating discriminatory practices have terminated and a recurrence of such act or action is unlikely.

b. This Agreement incorporates the complete understanding of the parties. Any modification of the Agreement shall be in writing and executed by each party of the Agreement to be valid.

c. The University agrees to have in force, during the Agreement period and available for inspection, a policy regarding a drug-free workplace. The policy shall contain:

- (1) A statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the University's workplace;
- (2) The specific actions that will be taken against employee for violating the policy; and
- (3) A requirement that each employee shall receive a copy of the policy.

d. To the extent permitted by law, the University shall indemnify and hold harmless the Commission from any and all claims and liabilities, including costs and legal fees that may arise out of or on account of any failure on the part of the University to perform such duties for the Commission as herein specified. This obligation shall survive the expiration or termination of this Agreement.

e. The books of account, files, and other records of the University, which are applicable to this Agreement, shall be available for inspection, review, and audit by the Commission and its representatives to determine the proper application and use of all funds paid to and for the account or benefit of the University. If any litigation or audit is begun or a claim is instituted involving the Agreement, the University shall retain the records beyond the five (5) year period until litigation, audit findings, or any claims have been fully resolved and the Commission has agreed that such records no longer need to be retained.

- f. The Commission may pay for meals and/or related travel expense for Representatives of the University, with Commission approval, if such expenses apply to projects included in this contractual agreement or to report to the Commission on the on-going activities of the Contractor. These expenses shall be appropriately accounted for and reported to the Commission..
- g. The University specifically agrees that funds given to the University shall be used only for the projects and purposes enumerated herein, and further acknowledges that expenditures shall not be used for political activity.
- h. Any funds paid to the University, under this Agreement and not fully utilized and earned, pursuant to this Agreement during the Agreement period, shall be returned to the Commission, unless otherwise agreed. Furthermore, if the University fails to perform the duties as outlined herein, the University shall be required to repay any unearned funds received under this Agreement.
- i. This Agreement is not assignable without the express written approval of the Commission.
- j. This Agreement may be terminated by either of the parties hereto at any time by giving thirty (30) days advance written notice to the other party.
- k. The relationship of the Commission and the University, under this Agreement, shall be that of principal and independent contractor. It is understood by both the Commission and the University, that the University is not an employee of the Commission. It is understood that the Commission assumes no responsibility beyond those specifically stated in this Agreement.
- l. All provision of this Agreement are subject to the Americans with Disabilities Act.
- m. The University guarantees payment of compensation to injured workers according to the Nebraska Workers Compensation Act.

PERIODIC PROGRESS REPORTS:

The University shall provide the Commission with current year progress reports (written and verbal), at the November Research Planning meeting or upon request by the Commission. A final written summary will be submitted to the Commission at the conclusion of the project or April 1, 2014. The University shall publish the results of all Commission-funded research in The Bean Bag and provide electronic copies of research reports to the Commission for publication on the Commission web page.

TERMINATION/AMENDMENT

Whereas the parties to this agreement are both "agencies" of the State of Nebraska, this Agreement may be terminated by either party, upon sixty (60) days written notice, due to insufficient funding or appropriation. Revision or amendment of the Agreement may be made at any time upon written approval of the Commission and the University

Approved:

NEBRASKA DRY BEAN COMMISSION

7/11/13

Wesley Ullrich

Date

Wesley Ullrich, Chairman

7/18/13

BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA

Jeanne Wicks

Date

Jeanne Wicks, Director Sponsored Programs

1. Nebraska Dry Bean Commission
Improving the Production Efficiency and
Through a Collaborative, Innovative Program
Research Center

4. Contact Person: Dr. Linda E. Hager, Director
Nebraska Research and Extension Center
332-427-1294
Lhager@unl.edu
University of Nebraska - Lincoln, Lincoln, NE 68583

For Nebraska dry bean growers and others interested in a comprehensive
information is available at www.unl.edu. The University of Nebraska Research
and Extension Center is staffed with a cadre of experts who are available to address any
production, marketing and quality issues. A strong working relationship between the Nebraska
Dry Bean Commission and the University of Nebraska Research and Extension Center will facilitate the development of new products and the timely
exchange of that information with dry bean growers and processors.

For Nebraska dry bean growers and others interested in a comprehensive
in the industry, on-going, crop-based research and extension programs that
its standard when National producers require quality control information.
production and quality control programs and the industry's economic
production and quality control programs and the industry's economic
and general programs. Information on these programs is available and described
in the attached attachments by the University.

Specific Objectives and Procedures:
Data Projects and attachments to specific project objectives, procedures and
outcomes:

1. Field Resistance for Dry Beans (Hager)
2. New Alternative Chemical Products for Control of Aerial Disease in Dry Beans (Hager)
3. FieldPro and soil management for dry bean production (Hager)
4. Evaluating New Herbicide Programs for New Control in Dry Bean Production (Hager)
5. Iron Content of Nebraska's Dry Beans (Hager)
6. Developing Season Long Deficit Irrigation Strategies for Dry Bean Production (Hager)

5. Project Location:
The new projects will be conducted at the research plots at the Panhandle
Research and Extension Center, Mitchell, NE or at the University of Nebraska

1. **Nebraska Dry Bean Commission**
2. **Increasing the Production Efficiency and Market Value of Dry Edible Beans Through a Collaborative, Integrated Program at the Panhandle Research and Extension Center**
3. **Project Year: July 1, 2013- June 30, 2014 / FY 13-14**

4. **Contact Person:** Dr. Linda S. Boeckner, District Director
 Panhandle Research and Extension Center
 308-632-1254
 Lboeckner1@unl.edu

Faculty Contributing to the Core Proposal: Jeffrey Bradshaw, Robert M. Harveson, Gary W. Hergert, Carlos Urrea, Robert G. Wilson

5. **Project Description:**

Potential Benefits to Nebraska's Dry Bean Industry

Dry bean producers, processors and marketers require new and timely information to optimize profitability. The University of Nebraska Panhandle Research and Extension Center is staffed with a cadre of specialists with expertise to address key production, processing and quality issues. A strong partnership between the Nebraska Dry Bean Commission and the University of Nebraska Panhandle Research and Extension Center will facilitate the development of new information and the timely exchange of that information with dry bean growers and processors.

For Nebraska dry bean growers and processors to maintain a competitive edge in the industry, an on-going, broad-based production research and extension effort must be sustained within the bean production region. Research continuity helps specialists anticipate problems and respond in a timely manner. Having this activity within the production region will assure relevant and timely information transfer between research and grower or processor. Methodology for each of the core components are described in the attached submissions by the researchers.

Specific Objectives and Procedures:

Core Projects (see attachments for specific project objectives, procedures and outcomes):

1. Insect Resistance for Dry Beans (Bradshaw, Urrea).
2. New Alternative Chemical Products for Managing Bacterial Diseases in Dry Beans (Harveson).
3. Fertilizer and soil management for dry bean production (Hergert).
4. ~~Exploring New Herbicide Programs For Weed Control In Dry Bean (Wilson). *no delete*~~
5. ~~Iron Content of Nebraska Elite Dry Bean Germplasm (Urrea/Schild).~~
5. ~~Developing Season Long Deficit Irrigation Strategies for Dry Bean Production (Harveson/Reichert).~~

6. **Project Location:**

The core projects will be conducted on the research plots at the Panhandle Research and Extension Center, Mitchell Ag Lab or within the Panhandle District.

7. Technology Transfer:

Project results are presented to bean growers and processors at the annual Bean Day hosted by Nebraska Dry Bean Growers Association in January, and annual summer field day in August. When appropriate, findings are presented in the Bean Bag, a publication of the Nebraska Dry Bean Growers Association that is supported with funds from the Nebraska Dry Bean Commission, and are posted on the dry edible bean page that is part of the statewide UNL Crop Watch website, as well as the UNL variety test web page (<http://varietytest.unl.edu>). Regular print and electronic media releases are additional avenues for reporting findings of dry edible bean research. Annual research updates are presented to the Nebraska Dry Bean Commission in November of each year and at professional society meetings, when appropriate.

8. Project Budget: (July 1, 2013 to June 30, 2014):

Budget total \$30,000 ~~25,000.00~~
Each Core Project will receive \$5,000.
Expendable Operating Supplies & Expenses
Services & Labor

Time line:

Preliminary report (NDBC research meeting)	November, 2013
Annual report	March 1, 2014

9. Potential Impact of Project Results:

The collective nature of these core proposals addresses different aspects of dry bean production that will improve the quality of dry beans, improve marketing potential, and enhance the production sustainability by improving input costs and times, or enhancing harvest potential. For specific statements of impact or expected outcomes on each of the core proposal see the accompanying attachments.

Nebraska Dry Bean Commission

Insect Resistance for Dry Beans

Project Year: July 1, 2013- June 30, 2014 / FY13-14

Contact Person: Jeff Bradshaw (in collaboration with Carlos Urrea); Panhandle Research and Extension Center, 308-632-1369; jbradshaw2@unl.edu

Project Description:

- a. **Justification and Background.** The western bean cutworm (WBC) and Mexican bean beetle (MBB) are two major pests of dry beans in western Nebraska. The WBC causes damage to the beans by feeding on the pods and developing beans while the MBB mostly feeds on leaves. Because dry bean yield and quality can be greatly impacted by damage from these insects, management of these insects is important to the production of high-yielding, quality beans. Dr. Urrea has collected a wide base of genetic material and it would be helpful to know how these two insects may respond to this material. The level of variability in WBC and MBB response to different bean lines will determine the future potential for developing improved varieties with resistance to WBC and MBB. To date we have established two Mexican bean beetle colonies, identified some advanced tools for resistance exploration in the future, and identified varieties and lines which vary in their ability to support MBB growth. Because WBC is not easily maintained in the laboratory, MBB resistance will be explored first. Our hope is that resistance against one chewing insect (MBB) may yield resistance against another (WBC).
- b. **Methodology.** Using a limited number of bean lines from Dr. Urrea's genetic material with broad genetic backgrounds, WBC and MBB will be screened for survival, development, and feeding. We will grow plants under controlled environments and they will be tested in the laboratory by removing leaves, based on our protocol developed in 2010. Screening for leaf-feeding resistance by these insects may preempt the need to identify resistance to pod feeding. Thus far our bioassays have indicated that we might be able to select some lines (MBB susceptible and resistance) for F1 crosses this winter. However, more assays are currently being run to inform these decisions.
- c. **Objectives.**
 - 1) Develop dry bean crosses containing resistance traits against Mexican bean beetles and possibly western bean cutworm
 - 2) Deploy field trials of dry bean lines with resistance to chewing insects

Core Budget: \$5000 for operating, supplies and personnel

Potential Impact of Project Results: We hope that over the next three years we can establish the extent of genetic variability in the dry bean lines that we have identified as having resistance to Mexican bean beetles. Once we determine how these resistance traits are segregating we can conduct field trials with the resulting lines. The development of effective Integrated Pest Management practices and the availability of insect-resistant varieties against the WBC and MBB will enable growers to better manage these insects with fewer inputs and ultimately increase food safety, bean quality and profitability.

Nebraska Dry Bean Commission

New Alternative Chemical Products for Managing Bacterial Diseases in Dry Beans

Project Year: July 1, 2013- June 30, 2014 / FY 13-14

Contact Person: Robert M. Harveson; PHREC/Plant Pathology; 308-632-1239;
rharveson2@unl.edu

Project Description:

- a. Justification and Background. Dry beans in Nebraska may be affected by a complex of different bacterial diseases. There are four major diseases that are commonly encountered, including common blight, halo blight, and brown spot, and wilt. Unlike many of the crops grown in western Nebraska, dry beans are particularly susceptible to bacterial diseases. These diseases have had major impacts on dry bean production wherever it has been done. Although significant efforts have been made to manage them for many years, little success has been achieved other than breeding for resistance. Unfortunately we do not currently have varieties with resistance to all pathogens, so other methods for management must be explored.

Disease development and secondary spread throughout fields are similar for all the bacterial diseases found in dry beans. Important factors promoting infection and spread include: planting infected seed, planting beans in close proximity to infected fields from the previous year, or using reduced tillage methods of land preparation. However, successful chemical control has resulted in inconsistent results for this group of bacterial diseases. Increased economic returns have been achieved after applications of copper-based chemical products for bacterial brown spot and halo blight in dry beans. Successful management of infection from common blight has been less successful and more variable among and between locations. Prior to the NDBC-funded studies in 2011 and 2012 the ability of copper to reduce disease problems from bacterial wilt was a complete unknown. We obtained some promising results in 2012 that gives us some hope for identifying some unique chemical products that may provide some added protection for beans in Nebraska from wilt while we are working toward developing new varieties with better tolerance for the various bacterial diseases.

- b. Methodology. The study will be conducted at the Panhandle REC utilizing a variety susceptible to all four bacterial diseases. Chemical applications using copper-based products will be compared with other new products with unique modes of action. All treatments will be first applied approximately 40 days after emergence (flowering) and then repeated every 7-10 days for a maximum of 2 applications per treatment. Standard yield (seed yield and size) and disease parameters (incidence and severity) will be employed to evaluate the performance of the chemical treatments. Inoculation of plots with all four bacterial pathogens will be attempted in order to evaluate effects of treatments on potential disease and yield reduction.
- c. Objectives. The primary objective of this proposed study is to evaluate the efficacy of various commercially available chemical sprays.

Core Budget: \$5000 for operating, supplies and personnel

Potential Impact of Project Results: Bacterial diseases have been a yield-limiting actor in bean production since its origin. Losses in both yield and quality have been demonstrated for all four pathogens. The pathogens survive in residue and infection is enhanced by varying weather conditions, which are difficult to predict. Thus at this time few options of any sort that are available for producers. Genetic resistance will ultimately be the most cost effective method for management. We are currently working on developing new resistant varieties, but it will still be several years until we have something commercially available. Copper based sprays have been sporadically effective for some diseases in Nebraska, but not others. Therefore we want to evaluate the efficacy of various chemical products currently available to growers for reducing losses from all four of these pathogens, comparing them to the performance of copper. If chemicals such as this are proven to effectively manage any of these diseases, we could use this as a short-term control measure until new resistant varieties are available for use.

...the most effective method for management. We are currently working on developing new resistant varieties, but it will still be several years until we have something commercially available. Copper based sprays have been sporadically effective for some diseases in Nebraska, but not others. Therefore we want to evaluate the efficacy of various chemical products currently available to growers for reducing losses from all four of these pathogens, comparing them to the performance of copper. If chemicals such as this are proven to effectively manage any of these diseases, we could use this as a short-term control measure until new resistant varieties are available for use.

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Core Budget: \$200 for spraying, supplies and personnel

Potential Impact of Project Results: Determine IOC and response to FeDCMA will be important to understand to producers when higher yields. This project will give knowledge on IOC and its further management that can help soy beans a profitable growing option.

Nebraska Dry Bean Commission

Fertilizer and Soil Management for Dry Bean Production

Project Year: July 1, 2013- June 30, 2014 / FY 13-14

Contact Person: Gary W. Hergert; Panhandle Research and Extension Center;
308-632-1372; ghergert1@unl.edu

Project Description:

- a. **Justification.** As the acreage of dry bean production under reduced tillage has expanded, nutrient requirements other than N have received little attention, especially micronutrients. Zn requirements, fertilizer sources and application methods for dry beans are well established. Iron deficiency chlorosis (IDC) is known to be a problem for many cultivars on calcareous soils, however, most Fe treatments are fairly expensive. Recently, there has been renewed interest in looking at FeEDDHA (ortho-ortho formulation) for IDC correction in soybean and sugar beet within the seed-furrow. Literature searches show no recent activity for dry bean, so this is novel research. Preliminary research at PHREC in 2011 showed a potential for economical yield increases with low rates of seed-furrow applied FeEDDHA. Expanded rate experiments are required to determine economical application rates. IDC of dry beans was researched at UNL and PHREC in the 1980's by Coyne and Clark. Major differences were shown between cultivars, but no methods or rating systems have been developed for newly released cultivars. Our approach would be to use to major varieties currently being grown (2 pinto and 2 Great Northern varieties) that comprise most of the acreage in the high plains dry bean growing region.
- b. **Methodology:** This study will be conducted at the UNL-PHREC under conventional furrow irrigation in a corn-sugar beet-corn-dry bean rotation. Four dry bean varieties (Marquis, Orion, Poncho and Montrose) will be planted in 6-22 inch rows and will receive in-furrow application of FeEDDHA in 6 gallons of water at planting. Fe rates will be 0, 0.5, 1.0 and 2.0 pounds of FeEDDHA per acre. Beans will be harvested using conventional techniques. According to dry bean industry agronomists, the four varieties selected represent 75-80% of the dry bean acreage in the NE Panhandle.
- c. **Objectives.** The objective of this project is to determine the response of dry beans to FeEDDHA on a calcareous soil for the two major market classes of dry beans grown in the NE Panhandle. Visual vigor ratings, IDC scoring during the season and final yield and quality will be determined.

Core Budget: \$5000 for operating, supplies and personnel

Potential Impact of Project Results: Determining IDC and response to FeEDDHA will be important to understand as producers attain higher yields. This project will fill a knowledge gap on IDC and Fe fertilizer management that can keep dry beans a profitable cropping option.

Nebraska Dry Bean Commission

Iron Content of Nebraska Elite Dry Bean Germplasm

Project Year: July 1, 2013 – June 30, 2014 / FY 13-14

Contact Person: Carlos A. Urrea; Panhandle Research and Extension Center; 308-632-0556, currea2@unl.edu; Jim Schild; Panhandle Research and Extension Center

Project Description:

- a. **Justification.** Dry bean is a major source of protein and several vitamins and minerals for people in Latin America and Africa. The nutrient content of food crops can be enhanced through biofortification, the process of breeding crops that are more efficient at extracting minerals and vitamins from the soil and incorporating them into plant material. These nutrients (e.g. Vitamin A, Zinc, and Iron) become available to humans when the crop is harvested and eaten. Development of biofortified varieties to provide essential micronutrients could help reduce anemia and other nutrition related health problems in hundreds of millions of people. Micronutrient deficiencies affect plant health as well. Deficiencies increase susceptibility to diseases, especially fungal root disease, and reduce stress tolerance. Thus, enhancing the ability of plants to extract and utilize micronutrients could potentially improve disease resistance and reduce the use of fungicides. A greater understanding of the iron and zinc content of dry bean is needed to develop biofortified varieties to enhance human and plant health. Currently, biofortified crops are developed through HarvestPlus.
- b. **Methodology.** Three hundred advanced and intermediate great northern, pinto lines, small red, black, light red kidney, and cranberry lines grown in 2013, will be sent to CIAT (International Center for Tropical Agriculture) for iron and zinc content analysis.
- c. **Objective:** 1) Screen advanced and intermediate UNL dry bean lines for iron and zinc content in seeds; 2) Identify one or two lines with high iron and zinc content to be used as parental line in the crossing block.

Core Budget: \$5000 for operating, supplies and personnel

Potential Impact of Project Results: This request is to assist the Nebraska Dry Bean Industry and our breeding efforts to identify a cultivar with high iron and zinc content. High iron and zinc seed content will add an extra value to our materials and open export opportunities to developing countries.

Nebraska Dry Bean Commission

Developing Season Long Deficit Irrigation Strategies for Dry Bean Production

Project Year: July 1, 2013- June 30, 2014 / FY 13-14

Contact Person: Robert M. Harveson and David Reichert, Panhandle Research and Extension Center; 308-632-1235; rharveson2@unl.edu and dreichert1@unl.edu

Project Description:

- a. **Justification.** The dry bean growing region in western Nebraska experienced severe drought during the early and mid 2000's. Surface water used for irrigation was reduced and producers looked for methods to stretch available water supplies. For ground water users, the drought increased the rate at which ground water levels were dropping which resulted in additional pumping restrictions. Since dry bean requires less water, 15-16 inches, compared to most irrigated crops grown in western Nebraska, the dry bean is often viewed as an ideal crop to grow when water supplies are limited. The question however is how limited are water supplies and what impact will having less than 15-16 inches of water available to the plant have on dry bean production? In addition, if water supplies are limited, when should water be applied to limit the impact on yield? Having less water available for irrigation will continue as a result of reoccurring drought and increased demand for water resources. As a result, season long water management strategies need to be understood for different degrees of water stress situations to properly implement dry bean deficit irrigation strategies.
- b. **Methodology:** A small plot sprinkler irrigation system has been constructed to compare nine irrigation treatments. Five of the irrigation treatments range from 0-100% of full irrigation in 25% increments. The other four treatments include applying greater and lesser amounts of water during three stages of growth (vegetative, flowering, pod fill). Treatments will be replicated six times in a split plot randomized complete block design and will include two varieties representing different plant architectures, Matterhorn, Type IIb and Marquis, Type IIIb. Plots will be 12-22 inch rows wide and 44 feet in length. A neutron probe will be used to measure volumetric soil water content throughout the growing season. Plant stand will be measured and seed size will be determined.
- c. **Objective:** Determine the influence on yield of dry bean when applying less irrigation water throughout the growing season than is needed to meet the crops full water demand.

Core Budget: \$5000 for operating, supplies and personnel

Potential Impact of Project Results: Early, late and mid season water management strategies have been studied in recent years. Irrigation strategies developed from these experiments do not fit all of the potential water stress situations. In most cases the producer must make a decision on irrigation without knowledge of when and how much precipitation might occur and in some cases, when and if irrigation water is available. The design of this project will allow comparison of incremental stages of deficit irrigation throughout the season in combination with full or deficit irrigation during different stages of plant growth. Results from this work will be used along with previous research results to develop dry bean irrigation strategies for producers when water supplies are limited whether the water shortage is short term, long term, or unexpected. This is the third year of the project for data collection.

64452 ⑧

AGREEMENT
between
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
and
NEBRASKA DRY BEAN COMMISSION

CONTRACT NUMBER: DB 2013-02

PROJECT TITLE: Breeding great northern, pinto, small red, black, large red kidney, cranberry and yellow beans for multiple disease resistance with high performance in western Nebraska

PROJECT INVESTIGATORS: Dr. Carlos Urrea

This Agreement, entered into by and between the Board of Regents of the University of Nebraska, hereinafter called the "University" and the Nebraska Dry Bean Commission, hereinafter called the "Commission", is made this 26th day of June, 2013. Said parties agree that the University will perform the work set in the proposal of DB 2013-02, attached, and that the Commission agrees to pay the University the total sum not to exceed \$59,000.00.

PERFORMANCE SCHEDULE:

Performance of the work set out in the proposal for DB 2013-02 will occur during the period of July 1, 2013 through June 30, 2014.

ALLOWABLE COSTS:

The total cost of performance of the contract is not to exceed \$59,000.00

METHOD OF PAYMENT:

Actual cost incurred not to exceed \$59,000.00. An advanced payment may be requested by the University for obligations incurred related to this project for the first six months work by submission of an Interagency Billing Transaction (IBT). A final payment will be made upon completion of the project for obligations incurred and invoiced on an IBT. In the event the Commission's funds available are insufficient at any time to enable the Commission to pay aforesaid agreed compensation, due to insufficient receipts from the dry edible bean check-off funds, the Commission giving the University a 60-day written notification of amount of such reduction may reduce the amount of aforesaid "payment" at any time.

ACCOUNTING EXPENDITURE REPORTS:

The University shall provide a semi-annual statement of actual expenses incurred through December 31st and at the conclusion of the project. Any unexpended balance shall be refunded within 90 days or the termination of the project.

SPECIAL PROVISIONS:

The parties mutually agree as follows:

a. The University shall:

- (1) Not discriminate against recipients of services on the basis of race, color, religion, national origin, sex, disability, or age; and
- (2) Not discriminate against any employee or applicant for employment on the basis of race, color, religion, national origin, sex, or qualified disability.

It is further understood and agreed that, if the University is in violation of this clause, it shall be barred forthwith from receiving further funds, unless a satisfactory showing is made indicating discriminatory practices have terminated and a recurrence of such act or action is unlikely.

b. This Agreement incorporates the complete understanding of the parties. Any modification of the Agreement shall be in writing and executed by each party of the Agreement to be valid.

c. The University agrees to have in force, during the Agreement period and available for inspection, a policy regarding a drug-free workplace. The policy shall contain:

- (1) A statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the University's workplace;
- (2) The specific actions that will be taken against employee for violating the policy; and
- (3) A requirement that each employee shall receive a copy of the policy.

d. To the extent permitted by law, the University shall indemnify and hold harmless the Commission from any and all claims and liabilities, including costs and legal fees that may arise out of or on account of any failure on the part of the University to perform such duties for the Commission as herein specified. This obligation shall survive the expiration or termination of this Agreement.

e. The books of account, files, and other records of the University, which are applicable to this Agreement, shall be available for inspection, review, and audit by the Commission and its representatives to determine the proper application and use of all funds paid to and for the account or benefit of the University. If any litigation or audit is begun or a claim is instituted involving the Agreement, the University shall retain the records beyond the five (5) year period until litigation, audit findings, or any claims have been fully resolved and the Commission has agreed that such records no longer need to be retained.

f. The Commission may pay for meals and/or related travel expense for Representatives of the University, with Commission approval, if such expenses apply to projects included in this contractual agreement or to report to the Commission on the on-going activities of the Contractor. These expenses shall be appropriately accounted for and reported to the Commission.

A. Commodity Board: NEBRASKA DRY BEAN COMMISSION

B. Project Title: Breeding great northern, pinto, small red, black, light red kidney, cranberry, and yellow beans for multiple disease resistance with high performance in western Nebraska.

C. Project Year/Time Period: FY 13-14 / July 1, 2013- June 30, 2014

D. Project Investigator: Carlos A. Urrea, PI, UNL-Panhandle Research and Extension Center, Agronomy & Horticulture, Phone: 308-632-0556, currea2@unl.edu.

E. Project Description:

1. Justification

Nebraska was first in great northern and second in pinto and light red kidney bean production in the United States in 2012. The development of improved varieties and germplasm with high yield potential, resistance to multiple diseases, greater water use efficiency, and better seed quality must to be continued in order to maintain market competitiveness for the Nebraska bean industry. Breeding for disease resistance in dry beans will lead to less chemical uses favoring the environment and reducing production costs.

2. Background information

Several advanced and early generation lines of great northern, pinto, small red, black, light red kidney, and cranberry beans tested during the 2012 growing season showed promising performance. Newly released great northern variety 'Coyne' performed well in 2011 and 2012. Coyne acreages were expanded in 2012. New segregant populations pyramiding genes of resistance will be made in 2012-2013 in the PHREC greenhouse based on yield and disease data collected during summer 2012 including yellow bean market class. DNA marker assisted selection is being used. Exotic tropical sources of drought and heat tolerance, disease resistance, and high iron seed content tested under low water conditions in 2012 will be tested in replicated trials in 2013. The identification of such germplasm will enhance the genetic variability and the probability of getting better adapted bean lines for western Nebraska. Our program has been collaborating with breeders in Colorado, North Dakota, and Michigan through the Midwestern Regional Bean Performance Nursery (MRPN) and with breeders in Washington, Idaho, and Colorado through the Western Regional Bean Trial-WRBT. Coyne was tested in the Cooperative Dry Bean Nursery (CDBN) in more than 10 locations in 2012.

3. Methodology

Demonstration plots (Mother trial) of 7 great northern and 7 advanced pinto lines will be planted at the PHREC-Scottsbluff and in growers' fields in 2013. In 2011 and before, the lines showed high yield performance, disease resistance (common blight, bean common virus, rust, and white mold), desirable plant architecture, and good seed quality. The same set of lines will be tested in 2013. Seed will be increased in

- g. The University specifically agrees that funds given to the University shall be used only for the projects and purposes enumerated herein, and further acknowledges that expenditures shall not be used for political activity.
- h. Any funds paid to the University, under this Agreement and not fully utilized and earned, pursuant to this Agreement during the Agreement period, shall be returned to the Commission, unless otherwise agreed. Furthermore, if the University fails to perform the duties as outlined herein, the University shall be required to repay any unearned funds received under this Agreement.
- i. This Agreement is not assignable without the express written approval of the Commission.
- j. This Agreement may be terminated by either of the parties hereto at any time by giving thirty (30) days advance written notice to the other party.
- k. The relationship of the Commission and the University, under this Agreement, shall be that of principal and independent contractor. It is understood by both the Commission and the University, that the University is not an employee of the Commission. It is understood that the Commission assumes no responsibility beyond those specifically stated in this Agreement.
- l. All provision of this Agreement are subject to the Americans with Disabilities Act.
- m. The University guarantees payment of compensation to injured workers according to the Nebraska Workers Compensation Act.

PERIODIC PROGRESS REPORTS:

The University shall provide the Commission with current year progress reports (written and verbal), at the November Research Planning meeting or upon request by the Commission. A final written summary will be submitted to the Commission at the conclusion of the project or April 1, 2014. The University shall publish the results of all Commission-funded research in The Bean Bag and provide electronic copies of research reports to the Commission for publication on the Commission web page.

TERMINATION/AMENDMENT

Whereas the parties to this agreement are both "agencies" of the State of Nebraska, this Agreement may be terminated by either party, upon sixty (60) days written notice, due to insufficient funding or appropriation. Revision or amendment of the Agreement may be made at any time upon written approval of the Commission and the University.

New Zealand. The lines will be tested in some grower fields (*Baby Trials*) located in Morrill, Scotts Bluff, and Box Butte counties in 2013. The lines will be compared to the cultivars planted at each participating farm.

Yield trials of advanced (F7-F8) and intermediate (F5-F6) great northern, pinto, small red, black, light red kidney, and cranberry bean lines will be replicated in larger plots at the PHREC at Scottsbluff and Mitchell. Seed will be increased in New Zealand. Approximately 400 intermediate great northern, pinto, black, small red, light red kidney, and cranberry lines selected for disease resistance and high yield performance during 2012 will be evaluated in 2013 in replicated plots. Great northern lines will be compared to Beryl-R, Orion, Marquis, Gemini, and Coyne. Pinto lines will be compared to Poncho, La Paz, Montrose, Buster, Baja, and Sonora. Small red lines will be compared to Merlot and UI 239. Black lines will be compared to Condor, Jaguar, and Zorro. Light red kidney lines will be compared to Cal Early, Sacramento, and Pink Panther. Cranberry lines will be compared to Capri, Bellagio, and USCR-CBB-20.

Early generation screening (F4-F5) of the 1,331 lines sent to Santa Isabel, Puerto Rico for seed increase in 2012-2013, will be conducted at the PHREC at Scottsbluff and Mitchell. Selected lines from Puerto Rico will be tested in replicated trials. Number of replications will depend on the quantity of seed harvested. Lines were selected from 12, 11, 40, 17, and 20 light red kidney, cranberry, great northern and pinto, small red, and black F2 segregant populations, respectively. Selections were based on plant aspect, plant architecture, early maturity, and disease resistance during the 2012 season at Scottsbluff. Additionally, another set of **early generation populations (F2-F3)** of great northern, pinto, light red kidney, small reds, and black beans generated in the PHREC's greenhouse during winter 2012-2014 will be advanced in larger plots. The number of rows will depend on the quantity of seed harvested in the greenhouse. A new set of yellow crosses will be developed.

Disease screening of advanced and intermediate great northern, pinto, light red kidney, cranberry, small reds, and black lines to common bacterial blight (CBB) will be conducted in an augmented replicated trial at West Central Research and Extension Center, North Platte and at the greenhouse facilities at Scottsbluff. XAN 159, USPT-CBB-6, and Neb#1 Sel. 27 will be used as resistant checks and Orion as susceptible check. Bean common rust will be screened at Beltsville, MD in collaboration with USDA-ARS, and at Lincoln, NE. Bean common mosaic virus will be screened at the PHREC greenhouse. Advanced great northern and pinto lines will be screened for resistance to white mold in replicated trials at the PHREC-Scottsbluff.

Exotic germplasm screening and introgression into the Nebraska elite lines will be continued during 2012-2013. Lines with resistance to several diseases, drought/heat tolerance, and high levels of iron and zinc seed content will be requested from the International Center for Tropical Agriculture (CIAT).

Newly selected great northern and pinto beans from 2012 will be included in the **Midwest Regional Performance Nursery (MRPN-2013)** to be tested in ND, CO, NE, and in the varietal trial at PHREC-Scottsbluff in 2013. These lines will also be tested in the **Western Regional Bean Trial (WRBT-2013)** in WA, CO, ID, and NE. The best adapted germplasm from those trials will be introgressed into the elite Nebraska lines considering Mesoamerican beans.

Seed increase: Ten lines (5 great northern and 5 pinto lines) will be increased in New Zealand. About 50 individual plant selections from each line will be planted. Uniform individual plant selections within each line will be harvested separately and bulked together based on seed uniformity. A winter nursery in Puerto Rico will be used to advance early generation lines.

Molecular DNA fingerprinting of our elite and advanced bean lines with molecular DNA markers will be continued in 2013 in order to characterize them before release. Several molecular DNA markers identifying resistance to rust *Ur-3* (SK-14), *Ur-6* (SBC6), *Ur-11* (Ur11-GT2), common bacterial blight (SAP6 and SU91), and bean common mosaic virus (SW13 and ROC11) will be used.

Canning of the elite great northern, pinto, light red kidney, cranberry, small reds, and black lines will be carried out at the USDA-ARS, East Lansing MI. Dry beans will be processed using a standard soak procedure. Soaked beans will be cooled and drained then, beans will be brined, exhausted, and canned using a Dixie canner model and stored for evaluation 2 weeks later.

4. Objectives

- Develop and select improved high-yielding great northern, pinto, light red kidney, cranberry, black, small reds, and yellow bean cultivars/germplasm for western Nebraska with multiple disease resistance. This includes selecting for plants that have upright plant architecture, earliness (95 days), and high quality seed.
- Screen exotic dry bean germplasm for resistance to the most limiting diseases in the Panhandle (common bacterial blight, bean rust, bean common mosaic virus, and white mold).
- Recombine elite bean lines with new sources of disease resistance.
- Screen breeding lines for molecular DNA markers.
- Introgress drought tolerance into Nebraska elite germplasm.
- Develop data for possible release of at least one great northern and one pinto dry bean germplasm/cultivar.

F. Project Location: This proposal will be conducted at the Panhandle Research and Extension Center, Scottsbluff and Mitchell., NE Disease screening will be done at the WREC in North Platte, NE (common bacterial blight), USDA-Beltsville, MD (bean rust), and PHREC-greenhouse, Scottsbluff, NE (bean common mosaic virus). Seed increase will be done at the Agricultural Experiment Station in Lingle, Wyoming; at the Experimental Station of 3rd Millenium Genetics in Santa Isabel, Puerto Rico; and at the Seeds Under in Blenheim, New Zealand.

G. Technology Transfer: Results will be disseminated through the Nebraska Bean Day, and Nebraska Field Days held by the Nebraska Dry Bean Growers Association in January and August 2014. Results will also be published in the Bean Bag newsletter, on the Panhandle Research and Extension Center dry bean web page

(<http://panhandle.unl.edu/web/panhandlerec/drybeans>), and in the Bean Improvement and Cooperative Journal.

H. Project Budget

Salaries and wages	18,200
Travel	7,000
All other Direct costs	<u>33,800</u>
Total amount requested	59,000

I. Potential impact of Project Results: This request is to assist our breeding efforts to support the development and release of new great northern, pinto, light red kidney, cranberry, black, small reds, and yellow bean cultivar/germplasm. The great northern cultivar Coyne was released in 2008 and Foundation Seed is being produced by Treasure Valley Seed Co. in Idaho. Five great northern and five pinto lines will be tested in grower's fields to determine their adaptability and yield performance in 2013. These lines will have the potential for being released either as varieties or as germplasm in 2013-2014.

C. Urrea, Dry Bean Specialist UNL- PHREC	L. Boeckner, District Director UNL-PHREC	D. Duncan, Associate Dean Agric. Research Division
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AGREEMENT
between
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
and
NEBRASKA DRY BEAN COMMISSION

CONTRACT NUMBER: DB 2013-03

PROJECT TITLE: Evaluation of dry bean cultivars for performance in Western Nebraska

PROJECT INVESTIGATORS: Jim Schild, Dr. Carlos Urrea

This Agreement, entered into by and between the Board of Regents of the University of Nebraska, hereinafter called the "University" and the Nebraska Dry Bean Commission, hereinafter called the "Commission", is made this 26th day of June, 2013. Said parties agree that the University will perform the work set in the proposal of DB 2013-03, attached, and that the Commission agrees to pay the University the total sum not to exceed \$9,500.00.

PERFORMANCE SCHEDULE:

Performance of the work set out in the proposal for DB 2013-03 will occur during the period of July 1, 2013 through June 30, 2014.

ALLOWABLE COSTS:

The total cost of performance of the contract is not to exceed \$9,500.00

METHOD OF PAYMENT:

Actual cost incurred not to exceed \$9,500.00. An advanced payment may be requested by the University for obligations incurred related to this project for the first six months work by submission of an Interagency Billing Transaction (IBT). A final payment will be made upon completion of the project for obligations incurred and invoiced on an IBT. In the event the Commission's funds available are insufficient at any time to enable the Commission to pay aforesaid agreed compensation, due to insufficient receipts from the dry edible bean check-off funds, the Commission giving the University a 60-day written notification of amount of such reduction may reduce the amount of aforesaid "payment" at any time.

ACCOUNTING EXPENDITURE REPORTS:

The University shall provide a semi-annual statement of actual expenses incurred through December 31st and at the conclusion of the project. Any unexpended balance shall be refunded within 90 days or the termination of the project.

SPECIAL PROVISIONS:

The parties mutually agree as follows:

a. The University shall:

- (1) Not discriminate against recipients of services on the basis of race, color, religion, national origin, sex, disability, or age; and
- (2) Not discriminate against any employee or applicant for employment on the basis of race, color, religion, national origin, sex, or qualified disability.

It is further understood and agreed that, if the University is in violation of this clause, it shall be barred forthwith from receiving further funds, unless a satisfactory showing is made indicating discriminatory practices have terminated and a recurrence of such act or action is unlikely.

b. This Agreement incorporates the complete understanding of the parties. Any modification of the Agreement shall be in writing and executed by each party of the Agreement to be valid.

c. The University agrees to have in force, during the Agreement period and available for inspection, a policy regarding a drug-free workplace. The policy shall contain:

- (1) A statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the University's workplace;
- (2) The specific actions that will be taken against employee for violating the policy; and
- (3) A requirement that each employee shall receive a copy of the policy.

d. To the extent permitted by law, the University shall indemnify and hold harmless the Commission from any and all claims and liabilities, including costs and legal fees that may arise out of or on account of any failure on the part of the University to perform such duties for the Commission as herein specified. This obligation shall survive the expiration or termination of this Agreement.

e. The books of account, files, and other records of the University, which are applicable to this Agreement, shall be available for inspection, review, and audit by the Commission and its representatives to determine the proper application and use of all funds paid to and for the account or benefit of the University. If any litigation or audit is begun or a claim is instituted involving the Agreement, the University shall retain the records beyond the five (5) year period until litigation, audit findings, or any claims have been fully resolved and the Commission has agreed that such records no longer need to be retained.

f. The Commission may pay for meals and/or related travel expense for Representatives of the University, with Commission approval, if such expenses apply to projects included in this contractual agreement or to report to the Commission on the on-going activities of the Contractor. These expenses shall be appropriately accounted for and reported to the Commission.

- g. The University specifically agrees that funds given to the University shall be used only for the projects and purposes enumerated herein, and further acknowledges that expenditures shall not be used for political activity.
- h. Any funds paid to the University, under this Agreement and not fully utilized and earned, pursuant to this Agreement during the Agreement period, shall be returned to the Commission, unless otherwise agreed. Furthermore, if the University fails to perform the duties as outlined herein, the University shall be required to repay any unearned funds received under this Agreement.
- i. This Agreement is not assignable without the express written approval of the Commission.
- j. This Agreement may be terminated by either of the parties hereto at any time by giving thirty (30) days advance written notice to the other party.
- k. The relationship of the Commission and the University, under this Agreement, shall be that of principal and independent contractor. It is understood by both the Commission and the University, that the University is not an employee of the Commission. It is understood that the Commission assumes no responsibility beyond those specifically stated in this Agreement.
- l. All provision of this Agreement are subject to the Americans with Disabilities Act.
- m. The University guarantees payment of compensation to injured workers according to the Nebraska Workers Compensation Act.

PERIODIC PROGRESS REPORTS:

The University shall provide the Commission with current year progress reports (written and verbal), at the November Research Planning meeting or upon request by the Commission. A final written summary will be submitted to the Commission at the conclusion of the project or April 1, 2014. The University shall publish the results of all Commission-funded research in The Bean Bag and provide electronic copies of research reports to the Commission for publication on the Commission web page.

TERMINATION/AMENDMENT

Whereas the parties to this agreement are both "agencies" of the State of Nebraska, this Agreement may be terminated by either party, upon sixty (60) days written notice, due to insufficient funding or appropriation. Revision or amendment of the Agreement may be made at any time upon written approval of the Commission and the University.

Approved:

NEBRASKA DRY BEAN COMMISSION

7-11-13
Date

Wesley Ullrich
Wesley Ullrich, Chairman

7-22-13
Date

BOARD OF REGENTS OF THE
UNIVERSITY OF NEBRASKA
Jeanne Wicks
Jeanne Wicks, Director
Sponsored Programs

Project Objectives:
Evaluate new bean cultivars, bean breeding lines, and standard cultivars from the major market classes in Nebraska for yield potential, maturity, disease resistance, and other adaptive traits.

Project Benefits:
This trial will aid producers in selecting varieties for use on their farms. It will provide an opportunity to both public and private breeders to evaluate promising material in Nebraska bean production areas prior to release.

Summary of Background Information:
Nebraska growers plant approximately 140,000 acres of dry edible beans annually. A systematic evaluation of dry bean cultivars from both public and private breeding programs is needed to evaluate cultivars for yield potential, as well as for other adaptive traits.

Description of Methodology:
Approximately 100 entries will be planted including entries from the Cooperative Bean Nursery in the yield trial. At least one location will be established at the Panhandle Research and Extension Center in Goodland with a second location at the Central Experiment Farm. A randomized complete block design with at least 4 replications will be used. Standard cultivars will be included for comparative purposes. Cultivars within market classes will be grouped by maturity date to facilitate mechanical harvesting. Performance measurements taken will be yield, seed size, maturity, and disease class traits. Disease ratings will be taken if present. Data collected in 2013 will be analyzed and compared with the data from previous years to maintain a history of cultivar performance. Results will be made available to the Nebraska Dry Bean Commission by Nov. 1st, 2013. Comprehensive results of the trial will be made available to Nebraska dry bean growers through meetings and publications like the BEAN BAG.

Budget Narrative:
Salaries & Wages: \$5,600 for Agricultural Technician
Fringe Benefits: \$2,400 for benefits for Agricultural Technician
Travel: \$150 for travel to plots
Materials & Supplies: \$500 for packaging materials, tags, plot markers, etc.

2013-2014 GRANT PROPOSAL TO THE NEBRASKA DRY BEAN COMMISSION

Project Title: Evaluation of Dry Bean Cultivars for Performance in Western Nebraska

Project: FY 2013-2014

Period: July 1, 2013 – June 30, 2014

Investigator: Jim Schild - University of Nebraska Extension Educator, Scottsbluff NE
Ph: 308-632-1480, jschild1@unl.edu

Carlos Urrea - University of Nebraska PREC, Scottsbluff NE, Ph: 308-632-0556,
currea2@unl.edu

Project Objective:

Evaluate new bean cultivars, bean breeding lines, and standard cultivars from the major market classes on performance in Nebraska for yield potential, maturity, disease reaction, and other adaptive traits.

Potential Benefits:

This trial will aid producers in selecting varieties for use on their farms. It will provide an opportunity to both public and private breeders to evaluate promising material in Nebraska's bean production area prior to release.

Summary of Background Information:

Nebraska growers plant approximately 140,000 acres of dry edible beans annually. A systematic evaluation of dry bean cultivars from both public and private breeding programs is needed to evaluate cultivars/lines for yield potential, as well as for other adaptive traits.

Description of Methodology:

Approximately 100 entries will be planted including entries from the Cooperative Bean Nursery in the yield trials. At least one location will be established at the Panhandle Research and Extension Center in Scottsbluff with a possible second location at the Mitchell Experiment Farm. A randomized complete block design with at least 4 replications will be used. Standard cultivars will be included for comparative purposes. Cultivars within market classes will be grouped by maturity date to facilitate mechanical harvesting. Performance measurements taken will be yield, seed size, maturity and other plant traits. Disease ratings will be taken if present. Data collected in 2013 will be combined and compared with the data from previous years to maintain a history of cultivar performance. Results will be made available to the Nebraska Dry Bean Commission by Nov. 1st, 2013. Comprehensive results of the trials will be made available to Nebraska dry bean growers through meetings and publications like the BEAN BAG.

Budget Narrative:

- Salaries & Wages: \$5,600 for Agricultural Technician
- Fringe Benefits: \$2,400 for benefits for Agricultural Technician
- Travel: \$700 for travel to plots
- Materials & Supplies: \$800 for packaging materials, bags, plot markers, etc.

For Administrative Use New	PROPOSAL BUDGET	
Effective Dates July 1, 2013 – June 30, 2014		
PRINCIPAL INVESTIGATOR(S): Jim Schild, Dr. Carlos Urrea		
PROJECT TITLE: Evaluation of Dry Bean Cultivars for Performance in Western Nebraska		
PROPOSED BUDGET SUMMARY <i>See Narrative Below</i>	FUNDS REQUESTED FOR	
	FY 13-14	FY
	Year 1	Year 2
A. SALARIES AND WAGES <i>Commodity Board usually does not pay the cost for Project Investigators</i>		
1. Senior Associates		
2. Research Associates – Post doctorate		
3. Other Professionals		
4. Prebaccalaureate Students		
5. Secretarial – Clerical		
6. Technical, Shop, Other	\$5,600	
7. Graduate Students		
B. FRINGE BENEFITS		
1. Faculty & Staff @ 30%	\$2,400	
2. Grad Student @ 41% plus Health Ins.		
C. NON-EXPENDABLE CAPITAL EQUIPMENT (\$5,000 or more; more than 2 years use)		
D. TRAVEL		
Domestic	\$700	
Foreign		
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)	\$800	
F. TOTAL AMOUNT OF THIS REQUEST	\$9,500	
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: \$5,600 for Agricultural Technician
- B. Fringe Benefits: \$2,400 for benefits for Agricultural Technician
- C. Non-expendable Capital Equipment
- D. Travel: \$700 for travel to plots
- E. All Other Direct Costs: \$800 for packaging materials, bags, plot markers, etc.

Revised 11/2012

64434

AGREEMENT
between
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
and
NEBRASKA DRY BEAN COMMISSION

CONTRACT NUMBER: DB 2013-04

PROJECT TITLE: Monitoring bean pathogen variation and screening breeding lines with relevant pathogen races/isolates for multiple disease resistance.

PROJECT INVESTIGATORS: Dr. Jim Steadman, Dr. Carlos Urrea, Jim Schild, Dr. Robert Harveson, Rachana Jhala

This Agreement, entered into by and between the Board of Regents of the University of Nebraska, hereinafter called the "University" and the Nebraska Dry Bean Commission, hereinafter called the "Commission", is made this 26th day of June, 2013. Said parties agree that the University will perform the work set in the proposal of DB 2013-04, attached, and that the Commission agrees to pay the University the total sum not to exceed \$8,075.00.

PERFORMANCE SCHEDULE:

Performance of the work set out in the proposal for DB 2013-04 will occur during the period of July 1, 2013 through June 30, 2014.

ALLOWABLE COSTS:

The total cost of performance of the contract is not to exceed \$8,075.00

METHOD OF PAYMENT:

Actual cost incurred not to exceed \$8,075.00. An advanced payment may be requested by the University for obligations incurred related to this project for the first six months work by submission of an Interagency Billing Transaction (IBT). A final payment will be made upon completion of the project for obligations incurred and invoiced on an IBT. In the event the Commission's funds available are insufficient at any time to enable the Commission to pay aforesaid agreed compensation, due to insufficient receipts from the dry edible bean check-off funds, the Commission giving the University a 60-day written notification of amount of such reduction may reduce the amount of aforesaid "payment" at any time.

ACCOUNTING EXPENDITURE REPORTS:

The University shall provide a semi-annual statement of actual expenses incurred through December 31st and at the conclusion of the project. Any unexpended balance shall be refunded within 90 days or the termination of the project.

SPECIAL PROVISIONS:

The parties mutually agree as follows:

a. The University shall:

- (1) Not discriminate against recipients of services on the basis of race, color, religion, national origin, sex, disability, or age; and
- (2) Not discriminate against any employee or applicant for employment on the basis of race, color, religion, national origin, sex, or qualified disability.

It is further understood and agreed that, if the University is in violation of this clause, it shall be barred forthwith from receiving further funds, unless a satisfactory showing is made indicating discriminatory practices have terminated and a recurrence of such act or action is unlikely.

b. This Agreement incorporates the complete understanding of the parties. Any modification of the Agreement shall be in writing and executed by each party of the Agreement to be valid.

c. The University agrees to have in force, during the Agreement period and available for inspection, a policy regarding a drug-free workplace. The policy shall contain:

(1) A statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the University's workplace;

(2) The specific actions that will be taken against employee for violating the policy; and

(3) A requirement that each employee shall receive a copy of the policy.

d. To the extent permitted by law, the University shall indemnify and hold harmless the Commission from any and all claims and liabilities, including costs and legal fees that may arise out of or on account of any failure on the part of the University to perform such duties for the Commission as herein specified. This obligation shall survive the expiration or termination of this Agreement.

e. The books of account, files, and other records of the University, which are applicable to this Agreement, shall be available for inspection, review, and audit by the Commission and its representatives to determine the proper application and use of all funds paid to and for the account or benefit of the University. If any litigation or audit is begun or a claim is instituted involving the Agreement, the University shall retain the records beyond the five (5) year period until litigation, audit findings, or any claims have been fully resolved and the Commission has agreed that such records no longer need to be retained.

f. The Commission may pay for meals and/or related travel expense for Representatives of the University, with Commission approval, if such expenses apply to projects included in this contractual agreement or to report to the Commission on the on-going activities of the Contractor. These expenses shall be appropriately accounted for and reported to the Commission.

- g. The University specifically agrees that funds given to the University shall be used only for the projects and purposes enumerated herein, and further acknowledges that expenditures shall not be used for political activity.
- h. Any funds paid to the University, under this Agreement and not fully utilized and earned, pursuant to this Agreement during the Agreement period, shall be returned to the Commission, unless otherwise agreed. Furthermore, if the University fails to perform the duties as outlined herein, the University shall be required to repay any unearned funds received under this Agreement.
- i. This Agreement is not assignable without the express written approval of the Commission.
- j. This Agreement may be terminated by either of the parties hereto at any time by giving thirty (30) days advance written notice to the other party.
- k. The relationship of the Commission and the University, under this Agreement, shall be that of principal and independent contractor. It is understood by both the Commission and the University, that the University is not an employee of the Commission. It is understood that the Commission assumes no responsibility beyond those specifically stated in this Agreement.
- l. All provision of this Agreement are subject to the Americans with Disabilities Act.
- m. The University guarantees payment of compensation to injured workers according to the Nebraska Workers Compensation Act.

PERIODIC PROGRESS REPORTS:

The University shall provide the Commission with current year progress reports (written and verbal), at the November Research Planning meeting or upon request by the Commission. A final written summary will be submitted to the Commission at the conclusion of the project or April 1, 2014. The University shall publish the results of all Commission-funded research in The Bean Bag and provide electronic copies of research reports to the Commission for publication on the Commission web page.

TERMINATION/AMENDMENT

Whereas the parties to this agreement are both "agencies" of the State of Nebraska, this Agreement may be terminated by either party, upon sixty (60) days written notice, due to insufficient funding or appropriation. Revision or amendment of the Agreement may be made at any time upon written approval of the Commission and the University.

Approved:

NEBRASKA DRY BEAN COMMISSION

7-11-13
Date

Wesley Ullrich
Wesley Ullrich, Chairman

7/18/13
Date

BOARD OF REGENTS OF THE
UNIVERSITY OF NEBRASKA

Jeanne Wicks
Jeanne Wicks, Director
Sponsored Programs

Justification
The majority of the plants and great northern (GN) varieties grown in Nebraska and adjacent areas, including those from selection and breeding for insect or disease resistance, including rust, and rot and white mold. Some are varieties that have been bred for resistance to the most common rust pathogen, *Puccinia blattaria*, but have not been bred for resistance to the most common rot pathogen, *Sclerotinia blattaria*. The rust pathogen gene U-3 found in Neryl R and Coyote, among others, has been bred into the rust races found in the U.S. Central U.S. Plains but none are available in blattaria and white mold. Some varieties are susceptible to multiple rust pathogens, as well as to rot and white mold. We have successfully pyramided and transferred genes to Charles Linn's breeding lines with resistance to rust and other races. This will be done through a multi-year program to be completed by 2015. Linn's breeding program will incorporate genes and alleles for broad-spectrum resistance to rust and white mold and diseases that need to be considered when selecting for water use efficiency and long-term multiple disease resistance, respectively. Appropriate sources or subspecies of the pathogen will be available if necessary by using results of a multi-year project. We work closely with the USDA in Fort Collins, as well as Howard Bennett, at Colorado State University, and other plant pathologists in the region in screening for white mold, rot and rust.

A beta variety with disease resistance has been derived from cross crossings of Linn's R, application and higher yields compared to other varieties under conditions to be used in the program. It exhibits disease resistance and white mold and rust and also reduces and disease resistance, marketing production to lower yields under water deficit conditions. Disease resistance maintains seed quality under conditions favorable for disease, but more importantly, reduces yield of varieties without rust resistance. Similarly, water use efficiency, an objective of the rust breeding program, would be negatively affected by rust, drought tolerance and water resistance need to be screened together to address improved water use efficiency. The research proposed leads to an immediate response for new varieties of release.

Backup work
My laboratory has had a multi-year research program to guide deployment of strategies to manage diseases of dry beans, especially through bean breeding, since 1976. Our rust and white mold pathogen collection consists of 300 races and subspecies isolates that provide a database to compare new pathogen isolate collections. Thus, we are able to challenge breeding lines daily with relevant local races but also genetic diversity for the future by using virulent races that could blow in from the south or be brought in from a distant area. Using multiple races,

1. **PROPOSAL:** Nebraska Dry Bean Commission
2. **PROJECT TITLE:** Monitoring bean pathogen variation and screening breeding lines with relevant pathogen races/isolates for multiple disease resistance.
3. **PROJECT PERIOD:** July 1, 2013 - June 30, 2014 (on-going project)
4. **INVESTIGATORS:** James R. Steadman, PI, IANR, Plant Pathology Dept., Lincoln
 Ph: (402) 472-3163 - E-mail: jsteadman1@unl.edu
 Carlos Urrea, Co-PI James Schild, Co-PI
 Robert Harveson, Co-PI Rachana Jhala, Rsch Tech.
5. **PROJECT DESCRIPTION:**

Justification:

The majority of the pinto and great northern (GN) varieties grown in Nebraska and adjacent areas, including many new releases, are susceptible to one or more diseases, including rust, root rot and white mold. Rust is a disease that is caused by a pathogen that has numerous races (ability to infect beans with different resistance genes). The resistance gene Ur-3 found in Beryl R. and Coyne, among others, has been resistant to the rust races found on the U.S. Central High Plains but new races reported in Michigan and North Dakota can cause rust on Ur-3 and Ur-6 resistance genes. Other varieties such as 'Orion' and 'Marquis', and varieties in other seed classes that comprise large bean acreages in the North and South Platte Valleys are susceptible to most rust pathogen races as well as to root rot and white mold. We have proactively pyramided rust resistances genes in Carlos Urrea's breeding lines with resistance to these and other races. Rust will be monitored each season to enable us to test lines in Dr. Urrea's breeding program with appropriate races and select for broad rust resistance. Similarly, root rot and white mold are diseases that need to be considered when selecting for water use efficiency and long-term multiple disease resistance, respectively. Appropriate isolates or subspecies of the pathogens will be available for screening by using results of a multistate project. We work closely with the USDA in Beltsville, as well as Howard Schwartz, at Colorado State University, and other plant pathologists in the region in screening for white mold, root rot and rust.

A bean variety with disease resistance has value derived from cost savings of fungicide applications and higher yields compared to other varieties under moderate to severe disease pressure. In addition, since rust and white mold can cause seed size reduction and discoloration, marketing problems due to lower grades would cause further losses. Disease resistance maintains seed quality under conditions favorable for disease, but most importantly, reduces cost of production without cost to growers. Similarly, water use efficiency, an objective of the bean breeding program, would be negatively affected by root rot. Drought tolerance and root rot resistance need to be screened together to address improved water use efficiency. The research proposed leads to an insurance coverage for new cultivars we release.

Background:

My laboratory has had a pathogen monitoring program to guide deployment of strategies to manage diseases of dry beans, especially through bean breeding, since 1970. Our rust and white mold pathogen collection contains over 500 races and subspecies isolates that provide a database to compare new pathogen isolate collections. Thus, we are able to challenge breeding lines not only with relevant local races but also protect the crop for the future by using virulent races that could blow in from the south or be brought in with contaminated seed. Using multiple races,

we can thus select for resistance that will involve multiple genes and be stable over time. We also have access to multi-site testing of promising white mold resistant bean lines through a USDA National Sclerotinia Initiative grant. This grant will help identify partial resistance for the breeding program to build some protection against white mold damage into future varieties; something that previously was not available.

The collaboration and cooperation within the NE bean breeding/pathology programs and other members of the 'bean team' provide our industry with research that reduces costs of production. Nebraska also benefits from our interaction with North Dakota, Michigan, Colorado, USDA and industry scientists. The recently released the great northern 'Coyne' with high yield, excellent seed quality, and strong common blight, rust and bean common mosaic resistances is a product of that collaboration. Elite lines with even more quality and production traits are poised for release.

With access to research information and improved germplasm from collaborators as well as our own monitoring of rust and other pathogen variability, we are positioned to develop disease resistant bean varieties and management strategies to help the Nebraska Bean Industry to be a low cost producer of high quality GN and pinto beans as well as black, kidney and red classes.

Methodology:

Bean rust race variation will be monitored in the North and South Platte Valleys wherever rust is reported. We depend on help from growers, dealers, field scouts, extension educators, aerial applicators and anyone with an interest in locating rust throughout the growing season. We also monitor other relevant pathogen isolates sent to or collected by my collaborators and used to screen breeding lines. We have excellent greenhouse and laboratory facilities, expertise, and relevant pathogen collections to help the breeding program incorporate resistance into elite dry bean lines.

Objectives and Procedures:

- (A) Monitor races of the bean rust pathogen and isolates of *Sclerotinia sclerotiorum* in bean fields in Nebraska and, monitor adjacent bean growing areas. Mobile nurseries containing bean lines with different rust resistance genes will be used to monitor rust infection areas. If rust develops on a source of a resistance gene(s), leaf samples will be collected at each mobile nursery site and analyzed in Lincoln. Sclerotia of the white mold pathogen will be collected and characterized to identify clones and levels of aggressiveness. Root rot pathogen isolates also will be identified and characterized.
- (B) Utilize rust pathogen races identified in sampling, especially any found with high virulence, as well as isolates of *S. sclerotiorum* and *R. solani* to screen breeding lines and recombinant inbred lines used to develop molecular markers for disease resistance genes in collaboration with Dr. Urrea.

6. PROJECT LOCATIONS: UNL and PHREC

7. TECHNOLOGY TRANSFER:

The Bean Field Day at PHREC, Bean Bag articles, Bean Improvement Cooperative reports, and new varieties and germplasm released will bring our research to the growers and the bean industry.

8. PROJECT BUDGET:

For Administrative Use		PROPOSAL BUDGET	
Effective Dates July 1, 2013 – June 30, 2014			
PRINCIPAL INVESTIGATOR(S): J.R. Steadman, PI; R. Harveson, J. Schild and C. Urrea, Co-PIs PROJECT TITLE: Monitoring bean pathogen variation and screening breeding lines with relevant pathogen races/isolates for multiple disease resistance.			
PROPOSED BUDGET SUMMARY <i>See Narrative Below</i>		FUNDS REQUESTED FOR	
		FY 14	FY
		Year 1	Year 2
A. SALARIES AND WAGES <i>Commodity Board usually does not pay the cost for Project Investigators</i>			
1. Senior Associates			
2. Research Associates – Post doctorate			
3. Other Professionals			
4. Prebaccalaureate Students		\$2000	
5. Secretarial – Clerical			
6. Technical, Shop, Other – 1 month		\$2750	
7. Graduate Students			
B. FRINGE BENEFITS			
1. Managerial/professional @ 30%		\$825	
2. Grad Student @ 41% plus Health Ins.			
C. NON-EXPENDABLE CAPITAL EQUIPMENT (\$5,000 or more; more than 2 years use)			
D. TRAVEL		Domestic	\$1500
		Foreign	
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		\$1000	
F. TOTAL AMOUNT OF THIS REQUEST		\$8,075	
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
 - Undergraduate student
 - Technologist 1 mo. @\$2,750 per month
- B. Fringe Benefits – 30% for technologist
- C. Travel - Domestic trips between Lincoln and Scottsbluff and one trip to USDA in Maryland

D. All Other Direct Costs

Soil, Trays, Pots, DNA Analysis \$500, Greenhouse Rental \$500

9. **POTENTIAL IMPACT OF PROJECT RESULTS:**

A bean variety with disease resistance has value derived from cost savings of fungicide applications and higher yields compared to other varieties under moderate to severe disease pressure. In addition, since rust and white mold can cause seed size reduction and discoloration, marketing problems due to lower grades would cause further losses. Disease resistance maintains seed quality under conditions favorable for disease, but most importantly, reduces cost of production without cost to growers. Similarly, water use efficiency, an objective of the bean breeding program, would be negatively affected by root rot. Drought tolerance and root rot resistance need to be screened together to address improved water use efficiency.

AGREEMENT
between
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
and
NEBRASKA DRY BEAN COMMISSION

CONTRACT NUMBER: DB 2013-05

PROJECT TITLE: Improving dry edible bean utilization in the food industry: Developing new ingredients and products from milled and separated fractions of great northern beans

PROJECT INVESTIGATORS: Dr. Wajira Ratnayake, Dr. Devin Rose

This Agreement, entered into by and between the Board of Regents of the University of Nebraska, hereinafter called the "University" and the Nebraska Dry Bean Commission, hereinafter called the "Commission", is made this 26th day of June, 2013. Said parties agree that the University will perform the work set in the proposal of DB 2013-05, attached, and that the Commission agrees to pay the University the total sum not to exceed \$35,984.00.

PERFORMANCE SCHEDULE:

Performance of the work set out in the proposal for DB 2013-05 will occur during the period of July 1, 2013 through June 30, 2014.

ALLOWABLE COSTS:

The total cost of performance of the contract is not to exceed \$35,984.00.

METHOD OF PAYMENT:

Actual cost incurred not to exceed \$35,984.00. An advanced payment may be requested by the University for obligations incurred related to this project for the first six months work by submission of an Interagency Billing Transaction (IBT). A final payment will be made upon completion of the project for obligations incurred and invoiced on an IBT. In the event the Commission's funds available are insufficient at any time to enable the Commission to pay aforesaid agreed compensation, due to insufficient receipts from the dry edible bean check-off funds, the Commission giving the University a 60-day written notification of amount of such reduction may reduce the amount of aforesaid "payment" at any time.

ACCOUNTING EXPENDITURE REPORTS:

The University shall provide a semi-annual statement of actual expenses incurred through December 31st and at the conclusion of the project. Any unexpended balance shall be refunded within 90 days or the termination of the project.

SPECIAL PROVISIONS:

The parties mutually agree as follows:

a. The University shall:

- (1) Not discriminate against recipients of services on the basis of race, color, religion, national origin, sex, disability, or age; and
- (2) Not discriminate against any employee or applicant for employment on the basis of race, color, religion, national origin, sex, or qualified disability.

It is further understood and agreed that, if the University is in violation of this clause, it shall be barred forthwith from receiving further funds, unless a satisfactory showing is made indicating discriminatory practices have terminated and a recurrence of such act or action is unlikely.

b. This Agreement incorporates the complete understanding of the parties. Any modification of the Agreement shall be in writing and executed by each party of the Agreement to be valid.

c. The University agrees to have in force, during the Agreement period and available for inspection, a policy regarding a drug-free workplace. The policy shall contain:

- (1) A statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the University's workplace;
- (2) The specific actions that will be taken against employee for violating the policy; and
- (3) A requirement that each employee shall receive a copy of the policy.

d. To the extent permitted by law, the University shall indemnify and hold harmless the Commission from any and all claims and liabilities, including costs and legal fees that may arise out of or on account of any failure on the part of the University to perform such duties for the Commission as herein specified. This obligation shall survive the expiration or termination of this Agreement.

e. The books of account, files, and other records of the University, which are applicable to this Agreement, shall be available for inspection, review, and audit by the Commission and its representatives to determine the proper application and use of all funds paid to and for the account or benefit of the University. If any litigation or audit is begun or a claim is instituted involving the Agreement, the University shall retain the records beyond the five (5) year period until litigation, audit findings, or any claims have been fully resolved and the Commission has agreed that such records no longer need to be retained.

f. The Commission may pay for meals and/or related travel expense for Representatives of the University, with Commission approval, if such expenses apply to projects included in this contractual agreement or to report to the Commission on the on-going activities of the Contractor. These expenses shall be appropriately accounted for and reported to the Commission.

- g. The University specifically agrees that funds given to the University shall be used only for the projects and purposes enumerated herein, and further acknowledges that expenditures shall not be used for political activity.
- h. Any funds paid to the University, under this Agreement and not fully utilized and earned, pursuant to this Agreement during the Agreement period, shall be returned to the Commission, unless otherwise agreed. Furthermore, if the University fails to perform the duties as outlined herein, the University shall be required to repay any unearned funds received under this Agreement.
- i. This Agreement is not assignable without the express written approval of the Commission.
- j. This Agreement may be terminated by either of the parties hereto at any time by giving thirty (30) days advance written notice to the other party.
- k. The relationship of the Commission and the University, under this Agreement, shall be that of principal and independent contractor. It is understood by both the Commission and the University, that the University is not an employee of the Commission. It is understood that the Commission assumes no responsibility beyond those specifically stated in this Agreement.
- l. All provision of this Agreement are subject to the Americans with Disabilities Act.
- m. The University guarantees payment of compensation to injured workers according to the Nebraska Workers Compensation Act.

PERIODIC PROGRESS REPORTS:

The University shall provide the Commission with current year progress reports (written and verbal), at the November Research Planning meeting or upon request by the Commission. A final written summary will be submitted to the Commission at the conclusion of the project or April 1, 2014. The University shall publish the results of all Commission-funded research in The Bean Bag and provide electronic copies of research reports to the Commission for publication on the Commission web page.

TERMINATION/AMENDMENT

Whereas the parties to this agreement are both "agencies" of the State of Nebraska, this Agreement may be terminated by either party, upon sixty (60) days written notice, due to insufficient funding or appropriation. Revision or amendment of the Agreement may be made at any time upon written approval of the Commission and the University.

Approved:

7-11-13
Date

7/18/13
Date

NEBRASKA DRY BEAN COMMISSION

Wesley Ullrich
Wesley Ullrich, Chairman

**BOARD OF REGENTS OF THE
UNIVERSITY OF NEBRASKA**

Jeanne Wicks
Jeanne Wicks, Director
Sponsored Programs

Nebraska Dry Bean Commission

Project title: Improving dry-edible bean utilization in the food industry: Developing new ingredients and products from milled and separated fractions of Great Northern beans.

Project year/Time period: FY 2013-2014. This is a new project.

Principal Investigator: Wajira S. Ratnayake, Ph.D.
Research Assistant Professor,
Applied Research & Engineering, The Food Processing Center,
University of Nebraska-Lincoln, Lincoln, NE 68583-0930.
Email. wajira@unl.edu, Tel. (402)472-2142

Co-Principal Investigator: Devin J. Rose, Ph.D.
Assistant Professor,
Department of Food Science & Technology,
University of Nebraska-Lincoln, Lincoln, NE 68583-0919.

Project Description:

Most Nebraska grown dry-edible beans are marketed and consumed as minimally processed whole seeds, with harvesting, cleaning, and bagging being the major, traditional processing operations. Our research, during the past year, has investigated the properties and functionalities of Nebraska Great Northern (GN) beans. This work produced strong evidence that GN bean could be used as value-added ingredients for food processing applications, particularly instant noodles, which is a major processed food consumed worldwide, especially in East Asia. Increasing interest from Chinese food manufacturers in utilizing ingredients that provide better nutritional quality in processed foods, such as instant noodles, has created an opportunity for the Nebraska dry bean industry to focus on new international markets for dry-edible beans. Finding new export markets for Nebraska grown dry-edible beans is critical for long-term economic sustainability of the commodity. The State of Nebraska, especially the dry-bean farmers, processors, and related agricultural operations as a whole, would benefit from increased market opportunities for dry-edible beans. Value added ingredient processing, such as milling, fractionation, and food ingredient production, is virtually non-existent for dry-edible beans, compared to other commodities produced in Nebraska. This project addresses this critical gap in technology and knowledge required for the food industry to use dry-edible beans in value-added product applications.

Background information:

Recent research, conducted at the UNL Food Processing Center, has identified the potential of GN beans in improving the nutritional value of instant noodles, which is usually recognized as "junk food" due to low nutritional value. So called junk foods contribute to a considerable proportion of global processed food consumption, both in developed and developing countries. Increasing consumer awareness and manufacturers' attempts to improve the quality of processed food have created opportunities for dry-edible beans to become a widely used commodity by the food industry. Our research has confirmed that GN beans have appropriate properties for food and ingredient applications. Partial replacement of traditional cereal flours with GN bean flour could considerably increase the nutritional value of certain processed foods, such as instant noodles.

The industry collaborations we have established with ingredient manufacturers in the U.S. and food processing companies (both national and international) have uniquely positioned The Food Processing

Center to create a long-term impact by introducing and promoting Nebraska dry-beans for new, value-added food applications.

Methodology:

Our previous research projects have successfully established the expertise and research infrastructure, including equipment, for this proposed work. This project will comprehensively characterize the major fractions, starch-, protein-, and fiber-rich, of GN beans. The fractions will be separated by modified milling techniques, optimized to improve separation of fractions and their nutritional quality.

Fractionation of starch-, protein-, and fiber-rich portions will be carried out utilizing our existing advanced milling capabilities (UNL Food Processing Center and UNL Wheat Quality Laboratory). Both wet- and dry-milling, combined with appropriate pre-treatments, will be employed for fractionation. Tampering, dehulling, cooking in the presence of food-grade chemicals, and drying will be tested, as appropriate, in optimizing milling conditions for better fraction separation. Milled samples will be separated by particle size and the fractions will be characterized for selected properties that are critical for food applications. Food applications will be determined based on the properties of separated fractions.

Separated GN bean fractions will be comprehensively characterized and evaluated for their functionalities. The applications for separated fractions will be determined based on the outcomes of the characterizations. Instant and other selected types of noodles and flat breads will be tested for new ingredient applications. We have appropriate processing equipment, available in our laboratories, for these tests.

The same approach could be applied on Pinto beans - the other major dry-edible bean market class produced in Nebraska, in an extension of this research into the future. We are not including work on Pinto beans for the two years project proposed here.

Calendar of activities:

Activity	Time (months)											
	2	4	6	8	10	12	14	16	18	20	22	24
Obtaining samples, processing, composition analysis.	X											
Optimizing fractionation processes		X	X									
Obtaining GN bean fractions and characterization				X	X							
Development of ingredient blends						X	X	X				
Testing ingredients in prototype products, ingredient optimizations									X	X	X	
Publication of results.						X						X

X = Time of specific activity.

Objectives:

Overall goal of this project is to increase the utilization of Nebraska dry-beans by the food industry. The specific objectives of this project are: (1) to identify and optimize pre-treatments to adjust flavor and nutritional parameters of GN beans, (2) to separate GN beans in to starch-, protein-, and fiber-rich fractions, (3) to characterize the properties of separated fractions, (4) to develop ingredients/ingredient blends from GN bean fractions, (5) to evaluate the properties of ingredient blends, (6) to test the new ingredients in prototype products, including sensory evaluations and (7) to evaluate the digestibility and nutritional value of GN bean containing products.

The main activities will involve developing and testing prototype ingredients for selected food applications, verifying their in-product functionalities, and assessing digestibility and nutritional value of the prototype products. The work will be performed in three phases as follows:

Phase I: Selected hybrids and bulk GN bean samples will be fractionated into starch-, fiber-, and protein-rich fractions using modified wet-milling methods. These fractions will be characterized and their functionalities will be evaluated.

Phase II: Separated starch-, protein-, and fiber-rich fractions will be used in ingredient blends developed for specific food applications; instant noodles, flat breads, and extruded products, as appropriate. Prototype ingredient blends for product formulations will be developed.

Phase III: The digestibility and nutritional value of the prototype products will be tested *in vitro*. These tests will verify the improved nutritional value and quality of GN bean containing products.

Project location:

All proposed activities will be performed at The Food Processing Center/Department of Food Science & Technology laboratories under the supervision of Drs. Ratnayake and Rose. The findings that are attributed to and potentially controlled by agronomic practices will be shared with Nebraska dry bean farmers through UNL Panhandle Research & Extension Center. Project findings will be shared with food ingredient manufacturers and processors at conferences, meetings, and FPC workshops.

Potential impact of project results:

This project will increase the demand for Nebraska dry beans by creating new opportunities for the food industry to use the commodity in processed convenience foods. The goal is to develop new ingredients that could be effectively used in replacing traditional, less nutritious ingredients in convenience foods marketed both in the U.S. and international markets. Regulatory issues, increasing demand for non-GMO foods with high nutritional value, and health problems associated with long-term consumption of 'junk food' have created Nebraska dry-edible beans, especially Great Northern bean - a market class having desirable properties for food ingredient applications -, a great opportunity to become a unique source of food ingredients. High levels of protein and fiber, other important minor nutrients, such as vitamins and minerals, and certain nutraceuticals provide GN beans a competitive advantage over traditional (mostly cereal based) ingredients in improving nutritional value of processed foods.

The Food Processing Center's existing collaborations with ingredient manufacturers, Chinese academia and the food industry (both U.S. and Chinese) are critical and extremely useful for the success of this proposed project. We have communicated and/or had meetings with Nissin-Jinmailang Foods Co. (China), ADM (USA), and other U.S. based ingredient companies regarding this proposed work. We have received encouraging feedback from these companies, and some of them have expressed interest in collaborating with us in commercializing the new dry-bean based food ingredients. Results will also be shared with Nebraska Dry Bean Commission representatives at annual meetings.

As with any new technology, we expect the impacts of this project to be long-term with time allowed for the food industry to adopt the dry-bean based ingredients. Accessing huge international markets must be carried out with care, ensuring the availability of a continuous supply of dry-beans and processed ingredients of required quality and quantity. In China alone, approximately 1300 packets of instant noodles consumed every second. Considering those important facts, we expect this project to be an initiative for a long-term and continuous research effort in introducing Nebraska dry-edible beans to the global food industry.

Project budget:

For Administrative Use		PROPOSAL BUDGET	
Effective Dates			
PRINCIPAL INVESTIGATOR(S): Wajira S. Ratnayake, and Devin J. Rose.			
PROJECT TITLE: Improving dry-edible bean utilization in the food industry: Developing new ingredients and products from milled and separated fractions of Great Northern beans.			
PROPOSED BUDGET SUMMARY <i>See Narrative Below</i>		FUNDS REQUESTED FOR	
		FY 2013	FY 2014
		Year 1	Year 2
A. SALARIES AND WAGES <i>Commodity Board usually does not pay the cost for Project Investigators</i>			
1. Senior Associates		0.00	0.00
2. Research Associates – Post doctorate		0.00	0.00
3. Other Professionals		0.00	0.00
4. Prebaccalaureate Students		0.00	0.00
5. Secretarial – Clerical		0.00	0.00
6. Technical, Shop, Other		0.00	0.00
7. Graduate Students (Doctoral)		18,441.00	18,995.00
B. FRINGE BENEFITS			
1. Faculty & Staff @ 30%			
2. Grad Student @ 41% plus Health Ins.		9,043.00	9,418.00
C. NON-EXPENDABLE CAPITAL EQUIPMENT (\$5,000 or more; more than 2 years use)			
		0.00	0.00
D. TRAVEL			
Domestic		1,000.00	1,200.00
Foreign			
E. ALL OTHER DIRECT COSTS - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)		7,500.00	8,500.00
F. TOTAL AMOUNT OF THIS REQUEST		\$35,984.00	\$38,113.00
INSTITUTIONAL INVESTMENT: The University of Nebraska-Lincoln is committed to providing Institutional resources necessary to successfully implement and complete this project.			

Budget narrative:

Funds for salaries & wages, fringe benefits include one Doctoral level assistantship through Department of Food Science & Technology. Ms. Hui (Mary) Wang would carry out this work for her Doctoral thesis research.

Travel: To visit UNL Panhandle Research & Extension Center and dry bean processors in Scottsbluff, NE to collect sample and meetings (twice a year). In addition, these funds will partially cover the travel expenses for attending professional conferences (Institute of Food technologists Annual Meeting, and Sino-U.S. Health Forum) to present research results.

All other direct costs: Chemicals, enzymes, test kits, disposable laboratory-wear, and glassware, required for experiments. Supplies for equipment (liquid chromatograph, viscometer, pH meter), drying pans, consumables, and regular maintenance expenses. Pilot plant usage fees and operating supplies.

64424

AGREEMENT
between
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
and
NEBRASKA DRY BEAN COMMISSION

CONTRACT NUMBER: DB 2013-06

PROJECT TITLE: In-vitro testing of new alternative chemicals for suppressing common bean cultivars for molecular breeding.

PROJECT INVESTIGATORS: Dr. Robert Harveson

This Agreement, entered into by and between the Board of Regents of the University of Nebraska, hereinafter called the "University" and the Nebraska Dry Bean Commission, hereinafter called the "Commission", is made this 26th day of June, 2013. Said parties agree that the University will perform the work set in the proposal of DB 2013-06, attached, and that the Commission agrees to pay the University the total sum not to exceed \$2,500.00.

PERFORMANCE SCHEDULE:

Performance of the work set out in the proposal for DB 2013-06 will occur during the period of July 1, 2013 through June 30, 2014.

ALLOWABLE COSTS:

The total cost of performance of the contract is not to exceed \$2,500.00.

METHOD OF PAYMENT:

Actual cost incurred not to exceed \$2,500.00. An advanced payment may be requested by the University for obligations incurred related to this project for the first six months work by submission of an Interagency Billing Transaction (IBT). A final payment will be made upon completion of the project for obligations incurred and invoiced on an IBT. In the event the Commission's funds available are insufficient at any time to enable the Commission to pay aforesaid agreed compensation, due to insufficient receipts from the dry edible bean check-off funds, the Commission giving the University a 60-day written notification of amount of such reduction may reduce the amount of aforesaid "payment" at any time.

ACCOUNTING EXPENDITURE REPORTS:

The University shall provide a semi-annual statement of actual expenses incurred through December 31st and at the conclusion of the project. Any unexpended balance shall be refunded within 90 days or the termination of the project.

SPECIAL PROVISIONS:

The parties mutually agree as follows:

a. The University shall:

- (1) Not discriminate against recipients of services on the basis of race, color, religion, national origin, sex, disability, or age; and
- (2) Not discriminate against any employee or applicant for employment on the basis of race, color, religion, national origin, sex, or qualified disability.

It is further understood and agreed that, if the University is in violation of this clause, it shall be barred forthwith from receiving further funds, unless a satisfactory showing is made indicating discriminatory practices have terminated and a recurrence of such act or action is unlikely.

b. This Agreement incorporates the complete understanding of the parties. Any modification of the Agreement shall be in writing and executed by each party of the Agreement to be valid.

c. The University agrees to have in force, during the Agreement period and available for inspection, a policy regarding a drug-free workplace. The policy shall contain:

- (1) A statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the University's workplace;
- (2) The specific actions that will be taken against employee for violating the policy; and
- (3) A requirement that each employee shall receive a copy of the policy.

d. To the extent permitted by law, the University shall indemnify and hold harmless the Commission from any and all claims and liabilities, including costs and legal fees that may arise out of or on account of any failure on the part of the University to perform such duties for the Commission as herein specified. This obligation shall survive the expiration or termination of this Agreement.

e. The books of account, files, and other records of the University, which are applicable to this Agreement, shall be available for inspection, review, and audit by the Commission and its representatives to determine the proper application and use of all funds paid to and for the account or benefit of the University. If any litigation or audit is begun or a claim is instituted involving the Agreement, the University shall retain the records beyond the five (5) year period until litigation, audit findings, or any claims have been fully resolved and the Commission has agreed that such records no longer need to be retained.

f. The Commission may pay for meals and/or related travel expense for Representatives of the University, with Commission approval, if such expenses apply to projects included in this contractual agreement or to report to the Commission on the on-going activities of the Contractor. These expenses shall be appropriately accounted for and reported to the Commission.

- g. The University specifically agrees that funds given to the University shall be used only for the projects and purposes enumerated herein, and further acknowledges that expenditures shall not be used for political activity.
- h. Any funds paid to the University, under this Agreement and not fully utilized and earned, pursuant to this Agreement during the Agreement period, shall be returned to the Commission, unless otherwise agreed. Furthermore, if the University fails to perform the duties as outlined herein, the University shall be required to repay any unearned funds received under this Agreement.
- i. This Agreement is not assignable without the express written approval of the Commission.
- j. This Agreement may be terminated by either of the parties hereto at any time by giving thirty (30) days advance written notice to the other party.
- k. The relationship of the Commission and the University, under this Agreement, shall be that of principal and independent contractor. It is understood by both the Commission and the University, that the University is not an employee of the Commission. It is understood that the Commission assumes no responsibility beyond those specifically stated in this Agreement.
- l. All provision of this Agreement are subject to the Americans with Disabilities Act.
- m. The University guarantees payment of compensation to injured workers according to the Nebraska Workers Compensation Act.

PERIODIC PROGRESS REPORTS:

The University shall provide the Commission with current year progress reports (written and verbal), at the November Research Planning meeting or upon request by the Commission. A final written summary will be submitted to the Commission at the conclusion of the project or April 1, 2014. The University shall publish the results of all Commission-funded research in The Bean Bag and provide electronic copies of research reports to the Commission for publication on the Commission web page.

TERMINATION/AMENDMENT

Whereas the parties to this agreement are both "agencies" of the State of Nebraska, this Agreement may be terminated by either party, upon sixty (60) days written notice, due to insufficient funding or appropriation. Revision or amendment of the Agreement may be made at any time upon written approval of the Commission and the University.

Approved:

7-11-13
Date

NEBRASKA DRY BEAN COMMISSION

Wesley Ullrich
Wesley Ullrich, Chairman

7/18/13
Date

**BOARD OF REGENTS OF THE
UNIVERSITY OF NEBRASKA**

Jeanne Wicks
Jeanne Wicks, Director
Sponsored Programs

Nebraska Dry Bean Commission Proposal

Project Title: In-vitro testing of new alternative chemicals for suppressing bacterial plant pathogens

New Project – July 1, 2013-June 30, 2014

Principle Investigator:

Robert M. Harveson, Plant Pathology, PHREC
308-632-1239
rharveson2@unl.edu

Project Description:

1) Justification:

Dry beans in Nebraska may be affected by a complex of four major bacterial diseases that routinely limit production and profitability, including common blight, halo blight, and brown spot, and wilt. Unfortunately, few options are available for management until more varieties with disease tolerance are accessible for use by growers.

2) Background:

Infection and spread of disease throughout fields are similar for all the bacterial diseases found in dry beans. Important factors promoting infection and spread include: planting infected seed, planting beans in close proximity to infected fields from the previous year, or using reduced tillage methods of land preparation.

Management techniques utilizing chemicals for these bacterial diseases, in general, are not effective due to the fact that these pathogens are simply not sensitive to many known agricultural chemicals other than antibiotics such as streptomycin or penicillin. These products are prohibitively expensive for spraying crops on a field scale. Copper-containing chemicals are an exception for successful usage in bacterial-affected field crops. However, not all of the diseases are the same in response to being sprayed with copper. There are now some new alternative products commercially available that are advertised as effective suppressors of bacteria.

3) Methodology:

This proposed study is designed strictly for lab testing and will evaluate these new chemical agents in the lab for their ability to inhibit or halt the growth and reproduction of all four dry bean bacterial pathogens in culture. Each of the products (TBA) will be added to NBY medium at different rates followed by streaking each pathogen on the amended media. These products will also be compared with several copper-containing chemicals.

4) Objectives:

- 1) The objective of this proposed study is to evaluate the efficacy of several different copper-based chemicals and a number of new alternative chemicals with different modes of action for their ability to inhibit bacterial growth in culture.

Project Location:

The study will be conducted in the plant pathology laboratory at the Panhandle Research and Extension Center.

Technology Transfer:

Results will be disseminated at grower meetings, field days, and through written and electronic publications.

Project Budget:

Category	2013-14
Labor - Agricultural Technician	\$700
Fringe Benefits @ 30%	\$300
Lab Supplies (Petri plates and media)	\$1,500
Total	\$2,500

Potential Impact:

The concept of this research, in theory, will more rapidly eliminate some of the more inferior chemicals, thus providing an opportunity to more effectively select the promising chemicals with bacteriocidal activity prior to field testing. Those that do not stop the bacterial growth in laboratory culture will not likely be capable of adequately managing the diseases in the field.

For Administrative Use New	PROPOSAL BUDGET	
Effective Dates July 1, 2013 – June 30 2014		
PRINCIPAL INVESTIGATOR(S): Dr. Robert M. Harverson		
PROJECT TITLE: In-vitro testing of new alternative chemicals for suppressing bacterial plant pathogens		
PROPOSED BUDGET SUMMARY <i>See Narrative Below</i>	FUNDS REQUESTED FOR	
	FY 13-14	FY
	Year 1	Year 2
A. SALARIES AND WAGES <i>Commodity Board usually does not pay the cost for Project Investigators</i>		
1. Senior Associates		
2. Research Associates – Post doctorate		
3. Other Professionals		
4. Prebaccalaureate Students		
5. Secretarial – Clerical		
6. Technical, Shop, Other	\$700	
7. Graduate Students		
B. FRINGE BENEFITS		
1. Faculty & Staff @ 30%	\$300	
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 - 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	\$2,500	
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: Agricultural Technician \$700
- B. Fringe Benefits: Benefits @ 30% \$300
- C. Non-expendable Capital Equipment
- D. Travel
- E. All Other Direct Costs: Lab Supplies (Petri plates and media) \$1,500

64462

AGREEMENT
between
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
and
NEBRASKA DRY BEAN COMMISSION

CONTRACT NUMBER: DB 2013-07

PROJECT TITLE: Identification of highly regenerative and agrobacterium susceptible common bean cultivars for molecular breeding.

PROJECT INVESTIGATORS: Dr. Amitava Mitra, Dr. Tom Clemente

This Agreement, entered into by and between the Board of Regents of the University of Nebraska, hereinafter called the "University" and the Nebraska Dry Bean Commission, hereinafter called the "Commission", is made this 26th day of June, 2013. Said parties agree that the University will perform the work set in the proposal of DB 2013-07, attached, and that the Commission agrees to pay the University the total sum not to exceed \$20,000.00.

PERFORMANCE SCHEDULE:

Performance of the work set out in the proposal for DB 2013-07 will occur during the period of July 1, 2013 through June 30, 2014.

ALLOWABLE COSTS:

The total cost of performance of the contract is not to exceed \$20,000.00.

METHOD OF PAYMENT:

Actual cost incurred not to exceed \$20,000.00. An advanced payment may be requested by the University for obligations incurred related to this project for the first six months work by submission of an Interagency Billing Transaction (IBT). A final payment will be made upon completion of the project for obligations incurred and invoiced on an IBT. In the event the Commission's funds available are insufficient at any time to enable the Commission to pay aforesaid agreed compensation, due to insufficient receipts from the dry edible bean check-off funds, the Commission giving the University a 60-day written notification of amount of such reduction may reduce the amount of aforesaid "payment" at any time.

ACCOUNTING EXPENDITURE REPORTS:

The University shall provide a semi-annual statement of actual expenses incurred through December 31st and at the conclusion of the project. Any unexpended balance shall be refunded within 90 days or the termination of the project.

SPECIAL PROVISIONS:

The parties mutually agree as follows:

a. The University shall:

- (1) Not discriminate against recipients of services on the basis of race, color, religion, national origin, sex, disability, or age; and
- (2) Not discriminate against any employee or applicant for employment on the basis of race, color, religion, national origin, sex, or qualified disability.

It is further understood and agreed that, if the University is in violation of this clause, it shall be barred forthwith from receiving further funds, unless a satisfactory showing is made indicating discriminatory practices have terminated and a recurrence of such act or action is unlikely.

b. This Agreement incorporates the complete understanding of the parties. Any modification of the Agreement shall be in writing and executed by each party of the Agreement to be valid.

c. The University agrees to have in force, during the Agreement period and available for inspection, a policy regarding a drug-free workplace. The policy shall contain:

- (1) A statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the University's workplace;
- (2) The specific actions that will be taken against employee for violating the policy; and
- (3) A requirement that each employee shall receive a copy of the policy.

d. To the extent permitted by law, the University shall indemnify and hold harmless the Commission from any and all claims and liabilities, including costs and legal fees that may arise out of or on account of any failure on the part of the University to perform such duties for the Commission as herein specified. This obligation shall survive the expiration or termination of this Agreement.

e. The books of account, files, and other records of the University, which are applicable to this Agreement, shall be available for inspection, review, and audit by the Commission and its representatives to determine the proper application and use of all funds paid to and for the account or benefit of the University. If any litigation or audit is begun or a claim is instituted involving the Agreement, the University shall retain the records beyond the five (5) year period until litigation, audit findings, or any claims have been fully resolved and the Commission has agreed that such records no longer need to be retained.

f. The Commission may pay for meals and/or related travel expense for Representatives of the University, with Commission approval, if such expenses apply to projects included in this contractual agreement or to report to the Commission on the on-going activities of the Contractor. These expenses shall be appropriately accounted for and reported to the Commission.

- g. The University specifically agrees that funds given to the University shall be used only for the projects and purposes enumerated herein, and further acknowledges that expenditures shall not be used for political activity.
- h. Any funds paid to the University, under this Agreement and not fully utilized and earned, pursuant to this Agreement during the Agreement period, shall be returned to the Commission, unless otherwise agreed. Furthermore, if the University fails to perform the duties as outlined herein, the University shall be required to repay any unearned funds received under this Agreement.
- i. This Agreement is not assignable without the express written approval of the Commission.
- j. This Agreement may be terminated by either of the parties hereto at any time by giving thirty (30) days advance written notice to the other party.
- k. The relationship of the Commission and the University, under this Agreement, shall be that of principal and independent contractor. It is understood by both the Commission and the University, that the University is not an employee of the Commission. It is understood that the Commission assumes no responsibility beyond those specifically stated in this Agreement.
- l. All provision of this Agreement are subject to the Americans with Disabilities Act.
- m. The University guarantees payment of compensation to injured workers according to the Nebraska Workers Compensation Act.

PERIODIC PROGRESS REPORTS:

The University shall provide the Commission with current year progress reports (written and verbal), at the November Research Planning meeting or upon request by the Commission. A final written summary will be submitted to the Commission at the conclusion of the project or April 1, 2014. The University shall publish the results of all Commission-funded research in The Bean Bag and provide electronic copies of research reports to the Commission for publication on the Commission web page.

TERMINATION/AMENDMENT

Whereas the parties to this agreement are both "agencies" of the State of Nebraska, this Agreement may be terminated by either party, upon sixty (60) days written notice, due to insufficient funding or appropriation. Revision or amendment of the Agreement may be made at any time upon written approval of the Commission and the University.

Approved:

7-11-13
Date

7/18/13
Date

NEBRASKA DRY BEAN COMMISSION

Wesley Ullrich
Wesley Ullrich, Chairman

**BOARD OF REGENTS OF THE
UNIVERSITY OF NEBRASKA**

Jeanne Wicks
Jeanne Wicks, Director
Sponsored Programs

1. **PROPOSAL:** Nebraska Dry Bean Commission
2. **PROJECT TITLE:** Identification of highly regenerative and *Agrobacterium* susceptible common bean cultivars for molecular breeding
3. **PROJECT PERIOD:** July 1, 2013 – June 30, 2015
4. **INVESTIGATORS:** Amitava Mitra, Co-PI, IANR, Plant Pathology, UNL, Lincoln,
Phone: (402) 472-7054, E-Mail: amitral@unl.edu
Thomas Clemente, Co-PI, Agronomy & Horticulture, UNL
5. **PROJECT DESCRIPTION:**

Justification: Common bean (*Phaseolus vulgaris* L.) is an important crop of Nebraska. In spite of remarkable crop improvement achieved by conventional breeding methods, the limited germplasm and genetic variation in *P. vulgaris* and the incompatibility barrier between different species impede further breeding progress to transfer useful genes to *P. vulgaris* for disease resistance or tolerance to harsh environments. Other attempts such as the use of mutagenesis failed to resolve this need because of the low frequency and occurrence of many recessive and lethal genes. The introduction, expression and modulation of genes in transgenic plants are valuable methods to aid in hypothesis testing of gene function. Genetic engineering of common bean has had limited success in both public and private sector institutions, and has not kept pace with the advancements made in transformation systems of other legumes. Hence, additional investments will be required in order to develop a robust transformation system for *P. vulgaris* that is easily transferable across laboratories to maximize the translation of genomics data, including the recent completion of the genome sequence, into applied technologies. Noteworthy for the rationale in support of such investments, research and development into the creation of a transgenic *P. vulgaris* carrying novel transgenic trait(s) is merely the first step in entry to the marketplace. Subsequent market development is a multi-step process that requires addressing a series of regulatory hurdles that often take 10 to 15 years to meet. Therefore, while some may argue public perception of agriculture biotechnology may negatively impact the export market of common bean, this mind set is assuming that public acceptance of this powerful tool will not evolve over the next 15 to 20 years. Indeed, with the majority of soybean, maize and cotton production throughout the world being transgenic, along with the uptick of significant investment in wheat biotechnology, is a testament to the evolving public acceptance of the technology. Thus, the development of stable transformation systems in this species is important to geneticists, breeders and molecular biologists, and will greatly aid in our ongoing efforts to ensure a plentiful and safe food supply for future generations.

Improvement of common bean through biotechnological approaches has been limited due to its recalcitrance for genetic transformation. While transformation of common bean has been achieved by using biolistic approaches, no consistent and efficient *Agrobacterium tumefaciens* (*At*)-based method is yet available. Genetic transformation using *At* is a preferred approach due to low copy number, stability, precision, and defined integration of foreign genes. Gene transfer technology requires an efficient regeneration of whole plants from *in vitro* culture. Direct regeneration from explants via direct shoot organogenesis, avoiding as much the callus phase as possible, is recommended for plant regeneration.

We have recently received a grant from NIFA (USDA) to establish a reproducible and efficient common bean transformation protocol using *A. tumefaciens*. This work will use a common bean cultivar that is amenable to regeneration and *Agrobacterium* infection but is not commercially grown. As transformation methods developed with model systems often fail when applied to elite lines, it is desirable to identify elite lines amenable to transformation. The objective of this proposal is to screen twenty elite bean cultivars that are commercially used in production. This screening will identify most suitable elite lines that can be expeditiously used for transformation using the system developed with the support from NIFA. Development of an efficient and reliable common bean transformation system will allow introgression of disease resistance, drought tolerance along with end-use quality traits that have the potential to increase yield and quality, while reducing input production cost.

Background: Our laboratories have extensive plant tissue culture and plant transformation expertise and with ongoing research in common bean. We have tested many regeneration and transformation parameters that can be used to determine regeneration efficiencies of elite common bean cultivars via direct shoot organogenesis and the effectiveness of *Agrobacterium* infection. The University of Nebraska is uniquely qualified to pursue this project because of a strong common bean research experience in breeding and disease management as well as experience in tissue culture and transformation.

Methodology: Twenty elite common bean cultivars, representing the pinto, great northern, and light red kidney beans, will be obtained from the University of Nebraska's dry bean breeding and genetics program housed at the University's Panhandle Research and Extension Center in Scottsbluff, NE. The genotypes will be screened for efficient regeneration and *Agrobacterium* susceptibility. Our previously optimized regime will be used as a starting point and subsequent modifications will be made as needed. Visual marker genes will be used to monitor transformation efficiency, coupled with a herbicide selection system to allow for the rapid identification of transgenic cell lineages during culture of common bean cells.

Objectives and Procedures: The goal of this proposal is to identify elite *P. vulgaris* genotypes that are amenable to genetic transformation. To this end, we will screen 20 genotypes for *in vitro* culture capacity and susceptibility to *A. tumefaciens*.

These experiments will allow us to identify elite common bean cultivars with efficient direct organogenesis and *A. tumefaciens* infection for subsequent use for the development of transgenic lines.

6. **PROJECT LOCATION:** University of Nebraska – Lincoln

7. **TECHNOLOGY TRANSFER:** Peer reviewed publications and manuscripts, Bean Improvement Cooperative reports, presentations at scientific meetings, and access to UNL bean breeders will disseminate our research to the growers and the bean community.

8. **PROPOSAL BUDGET:**

For Administrative Use	PROPOSAL BUDGET	
Effective Dates: 7/1/2013 – 6/30/2015		
PRINCIPAL INVESTIGATOR(S): Amitava Mitra and Thomas E. Clemente, UNL		
PROJECT TITLE: Identification of highly regenerative and <i>Agrobacterium</i> susceptible common bean cultivars for molecular breeding		
PROPOSED BUDGET SUMMARY <i>See Narrative Below</i>	FUNDS REQUESTED FOR	
	FY	FY
	Year 1	Year 2
A. SALARIES AND WAGES <i>Commodity Board usually does not pay the cost for Project Investigators</i>		
1. Senior Associates		
2. Research Associates – Post doctorate		
3. Other Professionals		
4. Prebaccalaureate Students		
5. Secretarial – Clerical		
6. Technical, Shop, Other	7,700	7,700
7. Graduate Students		
B. FRINGE BENEFITS		
1. Faculty & Staff @ 30%	2,300	2,300
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 - Materials & Supplies, Subcontracts, Publication Costs, etc. (Budget Narrative should list these individual items and dollar amounts separately)	10,000	10,000
F. TOTAL AMOUNT OF THIS REQUEST	20,000	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: Part-time technician for tissue culture and greenhouse work
- B. Fringe Benefits: 30% for the Technician
- C. All Other Direct Costs: Tissue culture supplies, DNA/molecular biology, Plastic/glass wares, green house supplies - \$8,000
Greenhouse/growth chamber rental: \$2,000

9. POTENTIAL IMPACT OF PROJECT RESULTS:

Grain legumes are one of the most valuable sources of dietary proteins, common beans represent 50% of the grain legume consumed worldwide. The production of genetically modified common bean plants has been impeded by the availability of efficient techniques for introducing DNA into the plant genome and regeneration methods. A fast, reproducible and efficient transformation procedure is crucial to allow crop improvement. Identification of elite germplasm with high regeneration potential is an important factor for development of an efficient plant transformation method, especially for a recalcitrant crop like common bean, as transformation processes are notorious for significantly reducing regeneration rates.

A reliable common bean transformation system offers avenues for quick and targeted development of the next generation of improved common bean genotypes able to mitigate negative effects of diseases, drought and other adverse conditions stabilizing and improving productivity and availability of this nutritious food. Availability of transgenic bean lines will be invaluable to the ongoing comprehensive, integrated and multi-disciplinary approach for common bean improvement. The transgenic bean lines will be made available to the breeders at the University of Nebraska, researchers in the Common Bean Coordinated Agricultural Project and Dry Grain Pulses CRSP to be incorporated into the respective breeding programs.

AGREEMENT
between
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
and
NEBRASKA DRY BEAN COMMISSION

CONTRACT NUMBER: DB 2013-08

PROJECT TITLE: Identifying sources and mapping genes for bacterial wilt resistance and mapping for resistance genes.

PROJECT INVESTIGATORS: Dr. Carlos Urrea

This Agreement, entered into by and between the Board of Regents of the University of Nebraska, hereinafter called the "University" and the Nebraska Dry Bean Commission, hereinafter called the "Commission", is made this 26th day of June, 2013. Said parties agree that the University will perform the work set in the proposal of DB 2013-08, attached, and that the Commission agrees to pay the University the total sum not to exceed \$6,000.00.

PERFORMANCE SCHEDULE:

Performance of the work set out in the proposal for DB 2013-08 will occur during the period of July 1, 2013 through June 30, 2014.

ALLOWABLE COSTS:

The total cost of performance of the contract is not to exceed \$6,000.00.

METHOD OF PAYMENT:

Actual cost incurred not to exceed \$6,000.00. An advanced payment may be requested by the University for obligations incurred related to this project for the first six months work by submission of an Interagency Billing Transaction (IBT). A final payment will be made upon completion of the project for obligations incurred and invoiced on an IBT. In the event the Commission's funds available are insufficient at any time to enable the Commission to pay aforesaid agreed compensation, due to insufficient receipts from the dry edible bean check-off funds, the Commission giving the University a 60-day written notification of amount of such reduction may reduce the amount of aforesaid "payment" at any time.

ACCOUNTING EXPENDITURE REPORTS:

The University shall provide a semi-annual statement of actual expenses incurred through December 31st and at the conclusion of the project. Any unexpended balance shall be refunded within 90 days or the termination of the project.

SPECIAL PROVISIONS:

The parties mutually agree as follows:

a. The University shall:

- (1) Not discriminate against recipients of services on the basis of race, color, religion, national origin, sex, disability, or age; and
- (2) Not discriminate against any employee or applicant for employment on the basis of race, color, religion, national origin, sex, or qualified disability.

It is further understood and agreed that, if the University is in violation of this clause, it shall be barred forthwith from receiving further funds, unless a satisfactory showing is made indicating discriminatory practices have terminated and a recurrence of such act or action is unlikely.

b. This Agreement incorporates the complete understanding of the parties. Any modification of the Agreement shall be in writing and executed by each party of the Agreement to be valid.

c. The University agrees to have in force, during the Agreement period and available for inspection, a policy regarding a drug-free workplace. The policy shall contain:

- (1) A statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the University's workplace;
- (2) The specific actions that will be taken against employee for violating the policy; and
- (3) A requirement that each employee shall receive a copy of the policy.

d. To the extent permitted by law, the University shall indemnify and hold harmless the Commission from any and all claims and liabilities, including costs and legal fees that may arise out of or on account of any failure on the part of the University to perform such duties for the Commission as herein specified. This obligation shall survive the expiration or termination of this Agreement.

e. The books of account, files, and other records of the University, which are applicable to this Agreement, shall be available for inspection, review, and audit by the Commission and its representatives to determine the proper application and use of all funds paid to and for the account or benefit of the University. If any litigation or audit is begun or a claim is instituted involving the Agreement, the University shall retain the records beyond the five (5) year period until litigation, audit findings, or any claims have been fully resolved and the Commission has agreed that such records no longer need to be retained.

f. The Commission may pay for meals and/or related travel expense for Representatives of the University, with Commission approval, if such expenses apply to projects included in this contractual agreement or to report to the Commission on the on-going activities of the Contractor. These expenses shall be appropriately accounted for and reported to the Commission.

- g. The University specifically agrees that funds given to the University shall be used only for the projects and purposes enumerated herein, and further acknowledges that expenditures shall not be used for political activity.
- h. Any funds paid to the University, under this Agreement and not fully utilized and earned, pursuant to this Agreement during the Agreement period, shall be returned to the Commission, unless otherwise agreed. Furthermore, if the University fails to perform the duties as outlined herein, the University shall be required to repay any unearned funds received under this Agreement.
- i. This Agreement is not assignable without the express written approval of the Commission.
- j. This Agreement may be terminated by either of the parties hereto at any time by giving thirty (30) days advance written notice to the other party.
- k. The relationship of the Commission and the University, under this Agreement, shall be that of principal and independent contractor. It is understood by both the Commission and the University, that the University is not an employee of the Commission. It is understood that the Commission assumes no responsibility beyond those specifically stated in this Agreement.
- l. All provision of this Agreement are subject to the Americans with Disabilities Act.
- m. The University guarantees payment of compensation to injured workers according to the Nebraska Workers Compensation Act.

PERIODIC PROGRESS REPORTS:

The University shall provide the Commission with current year progress reports (written and verbal), at the November Research Planning meeting or upon request by the Commission. A final written summary will be submitted to the Commission at the conclusion of the project or April 1, 2014. The University shall publish the results of all Commission-funded research in The Bean Bag and provide electronic copies of research reports to the Commission for publication on the Commission web page.

TERMINATION/AMENDMENT

Whereas the parties to this agreement are both "agencies" of the State of Nebraska, this Agreement may be terminated by either party, upon sixty (60) days written notice, due to insufficient funding or appropriation. Revision or amendment of the Agreement may be made at any time upon written approval of the Commission and the University.

Approved:

7-11-13
Date

7/18/13
Date

NEBRASKA DRY BEAN COMMISSION

Wesley Ullrich
Wesley Ullrich, Chairman

**BOARD OF REGENTS OF THE
UNIVERSITY OF NEBRASKA**

Jeanne Wicks
Jeanne Wicks, Director
Sponsored Programs

PIU grant 55089

A. Commodity Board: NEBRASKA DRY BEAN COMMISSION

B. Project Title: Identifying sources and mapping genes for bacterial wilt resistance in dry beans.

C. Project Year/Time Period: July 1, 2011- June 30, 2012/1

D. Project Investigators: Carlos A. Urrea, PI, UNL-Panhandle Research and Extension Center, Agronomy & Horticulture, Phone: 308-632-0556, currea2@unl.edu

3

E. Project Description:

1. Justification

Bacterial wilt, caused by *Curtobacterium flaccumfaciens* pv. *Flaccumfaciens*, was one of the more problematic diseases of dry bean (*Phaseolus vulgaris* L.) throughout the irrigated High Plains (Colorado, Nebraska, and Wyoming) in the 1960s and early 1970s. Recently bacterial wilt re-emerged as a problem when it was detected in more than 300 fields in Nebraska, Colorado, and Wyoming in 2006. Affected fields were planted with dry beans from multiple market classes and seed sources, including yellow, great northern, and pinto beans. Bacterial wilt reduces seed quality and in some instances 10% of the total yield is discolored. This pathogen is considered an A2 quarantine pest for Europe and is subject to phytosanitary regulations in some countries and some states in the US. In addition, there are some health concerns. These issues could make it difficult for the Nebraska dry bean industry to market their beans. Very few sources of bacterial wilt resistance have been reported. Emerson, which has a large bright white seed coat, was released in 1971 by the University of Nebraska and has some resistance to bacterial wilt, halo blight, brown spot, and bean common mosaic virus. There is no information on mapping the bacterial wilt resistance genes.

2. Background information

In 2008 the Nebraska Dry Bean Commission funded the screening of the International Center for Tropical Agriculture (CIAT) dry bean core collection. A wild bean from the US dry bean core collection has been identified as a source of resistance. Sixteen genotypes from CIAT's collection showed resistance in 3 replicates so far. Results from three inoculations showed that 99.9 % of the US dry bean core collection was susceptible to bacterial wilt, and only 0.1% showed variability across the evaluations. This means that either no resistance is found in these lines, or that they may be segregating for resistance to the disease. The current cultivars Marquis, Orion, Beryl, Gemini, and La Paz were susceptible in all three inoculations. Thus, there is need to identify sources of resistance to bacterial wilt, study the genetics and map the genes.

3. Methodology

A total of 1,700 accessions from the CIAT core collection are being screened for resistance to bacterial wilt in the PHREC-Scottsbluff greenhouse facilities. The accessions are being planted in an augmented block design. In each block, Orion and Emerson are being planted as susceptible and resistant checks, respectively. Two seeds per accession are being planted in each individual pot. Temperature is being maintained at 82 °F in the greenhouse. A virulent bacterial wilt isolate from a Nebraska great northern bean field is being used for inoculation. Plants are being inoculated at the V2 stage of development. One plant will be punctured between the first and second node with a needle dipped into a 48-hour old bacterial culture. Negative controls consisted of plants punctured with a sterile needle in the same manner. Plants are being evaluated every 7-days after inoculation for presence or absence of bacterial wilt symptoms. Koch's postulates are being verified by re-isolation of the pathogen from symptomatic plants. The plants will be evaluated 7, 14, 28, 35, and 42 days after inoculation using a 1-5 scale, where 1= immune and 5= very susceptible.

Sixteen lines are showing resistance. They will be inoculated to 7 different bacterial wilt isolates to confirm their resistance (abandoned corn, Iowa, Motzkus, pink, small red A, soybean #1 and northern).

Resistant genotypes identified from the CIAT Dry Bean Core Collection will be crossed to the susceptible cultivars Orion and Myasi. Resistant genotypes including Emerson will be crossed among them to obtain the F1 generation to verify if the genes of resistance are different. F1 will be advanced to F2 through selfing. The F2 will be backcrossed to both parental lines (resistant and susceptible). The six generations from each cross (P1, P2, F1, F2, BCF1P1, and BC1F1P2) will be inoculated with bacterial wilt as described above.

DNA from the most extreme segregates (those with very high or very low tolerance) will be pooled to create susceptible and tolerant DNA bulk. RAPD markers polymorphic between the parents and the resistant and susceptible bulk will be subsequently screened against the entire F2 population. Significant association between the bacterial wilt and marker genotype will be determined by one-way ANOVA using PROC MIXED (SAS, 1994). Linkage relationships will be determined by MAPMAKER/EXP group command.

The bacterial wilt resistance genes, if identified, will be pyramided into the current great northern and pinto beans through hybridization.

For Administrative Use Revised 10/06	FY ____		
PROPOSAL BUDGET			
Effective Dates			
PRINCIPAL INVESTIGATOR(S): Carlos A. Urrea			
PROJECT TITLE: Identifying sources and mapping genes for bacterial wilt resistance in dry beans			
PROPOSED BUDGET SUMMARY <i>Attach Supplemental Detail for Items \$5,000 or more</i>	FUNDS REQUESTED FOR		
	Year 1	Year 2	
A. SALARIES AND WAGES			
1. Principal Investigator(s) <i>Commodity Board usually does not pay the cost</i>			
2. Senior Associates			
3. Research Associates – Post doctorate			
4. Other Professionals			
5. Prebaccalaureate Students			
6. Secretarial – Clerical			
7. Technical, Shop, Other			
B-1. FRINGE BENEFITS (Faculty & Staff) @ 28%			
8. Graduate Students			
B-2. FRINGE BENEFITS (Grad Student) @36% plus Health Ins.			
C. EXPENDABLE MATERIALS AND SUPPLIES (Attach supporting data)	Operating Supplies	6,000	6,000
	Operating Expenses/Services		
D. PUBLICATION COSTS			
E. TRAVEL	Domestic		
	Foreign		
F. SUBCONTRACTS (Attach separate budget pages for each)			
G. ALL OTHER DIRECT COSTS (Attach supporting data. List items & dollar amounts.)			
H. NON-EXPENDABLE CAPITAL EQUIPMENT (\$500 or more; more than 2 years use)			
I. INDIRECT COSTS (INSTITUTIONAL INVESTMENT*)	-0-	-0-	
J. TOTAL AMOUNT OF THIS REQUEST	6,000	6,000	

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

4. Objectives

- Study the genetics and map the genes of bacterial wilt resistance.
- Transfer bacterial wilt resistance into Nebraska elite great northern and pinto bean lines.

F. Project Location: This research will be conducted in the dry bean greenhouse and molecular lab facilities located at the Panhandle Research and Extension Center, Scottsbluff, NE.

G. Technology Transfer: Results will be disseminated through the Nebraska Bean Day, and Nebraska Field Days held by the Nebraska Dry Bean Growers Association in January and August 2012. Results will also be published in the Bean Bag newsletter, on the Panhandle Research and Extension Center dry bean web page (<http://panhandle.unl.edu/web/panhandlerec/drybeans>), and in the Bean Improvement and Cooperative Journal.

H. Project Budget

Materials and Supplies	6,000
Total amount requested	6,000

This budget will be expended in the following manner:

A. Materials and supplies: Super fine germinating mix (5 bags x \$25 each) (\$ 125); Media and petri dishes (\$200). DNA molecular reagents (taq DNA polymerase, dntps, SSRs, and other reagents) for use in DNA fingerprinting work in the molecular lab (\$5,675).

I. Potential Impact of Project Results

Since bacterial wilt is a re-emerging disease in the high plains and previous breeding efforts were stopped in the early 70s, there is a need to identify new sources of resistance and transfer those genes into the currently grown cultivars. Development of resistance is important because bacterial wilt is already an A2 quarantine pest and some restrictions could be applied to beans used as food, which would adversely affect the Nebraska bean industry. Pyramiding of bacterial wilt resistance genes is the recommended technique for incorporating resistance into new cultivars. Release of bean varieties with disease resistance will lower production costs and reduce pesticide use.

(63850)
prev.

AGREEMENT
between
BOARD OF REGENTS OF THE UNIVERSITY OF NEBRASKA
and
NEBRASKA DRY BEAN COMMISSION

CONTRACT NUMBER: DB 2013-09

**PROJECT TITLE: Incorporating dry edible beans into noodles to improve product nutrition value
– Phase II**

PROJECT INVESTIGATORS: Dr. Wajira Ratnayake

This Agreement, entered into by and between the Board of Regents of the University of Nebraska, hereinafter called the "University" and the Nebraska Dry Bean Commission, hereinafter called the "Commission", is made this 26th day of June, 2013. Said parties agree that the University will perform the work set in the proposal of DB 2013-09, attached, and that the Commission agrees to pay the University the total sum not to exceed \$7,500.00.

PERFORMANCE SCHEDULE:

Performance of the work set out in the proposal for DB 2013-09 will occur during the period of July 1, 2013 through June 30, 2014.

ALLOWABLE COSTS:

The total cost of performance of the contract is not to exceed \$7,500.00.

METHOD OF PAYMENT:

Actual cost incurred not to exceed \$7,500.00. An advanced payment may be requested by the University for obligations incurred related to this project for the first six months work by submission of an Interagency Billing Transaction (IBT). A final payment will be made upon completion of the project for obligations incurred and invoiced on an IBT. In the event the Commission's funds available are insufficient at any time to enable the Commission to pay aforesaid agreed compensation, due to insufficient receipts from the dry edible bean check-off funds, the Commission giving the University a 60-day written notification of amount of such reduction may reduce the amount of aforesaid "payment" at any time.

ACCOUNTING EXPENDITURE REPORTS:

The University shall provide a semi-annual statement of actual expenses incurred through December 31st and at the conclusion of the project. Any unexpended balance shall be refunded within 90 days or the termination of the project.

SPECIAL PROVISIONS:

The parties mutually agree as follows:

a. The University shall:

- (1) Not discriminate against recipients of services on the basis of race, color, religion, national origin, sex, disability, or age; and
- (2) Not discriminate against any employee or applicant for employment on the basis of race, color, religion, national origin, sex, or qualified disability.

It is further understood and agreed that, if the University is in violation of this clause, it shall be barred forthwith from receiving further funds, unless a satisfactory showing is made indicating discriminatory practices have terminated and a recurrence of such act or action is unlikely.

b. This Agreement incorporates the complete understanding of the parties. Any modification of the Agreement shall be in writing and executed by each party of the Agreement to be valid.

c. The University agrees to have in force, during the Agreement period and available for inspection, a policy regarding a drug-free workplace. The policy shall contain:

- (1) A statement notifying employees that the unlawful manufacture, distribution, possession, or use of a controlled substance is prohibited in the University's workplace;
- (2) The specific actions that will be taken against employee for violating the policy; and
- (3) A requirement that each employee shall receive a copy of the policy.

d. To the extent permitted by law, the University shall indemnify and hold harmless the Commission from any and all claims and liabilities, including costs and legal fees that may arise out of or on account of any failure on the part of the University to perform such duties for the Commission as herein specified. This obligation shall survive the expiration or termination of this Agreement.

e. The books of account, files, and other records of the University, which are applicable to this Agreement, shall be available for inspection, review, and audit by the Commission and its representatives to determine the proper application and use of all funds paid to and for the account or benefit of the University. If any litigation or audit is begun or a claim is instituted involving the Agreement, the University shall retain the records beyond the five (5) year period until litigation, audit findings, or any claims have been fully resolved and the Commission has agreed that such records no longer need to be retained.

f. The Commission may pay for meals and/or related travel expense for Representatives of the University, with Commission approval, if such expenses apply to projects included in this contractual agreement or to report to the Commission on the on-going activities of the Contractor. These expenses shall be appropriately accounted for and reported to the Commission.

- g. The University specifically agrees that funds given to the University shall be used only for the projects and purposes enumerated herein, and further acknowledges that expenditures shall not be used for political activity.
- h. Any funds paid to the University, under this Agreement and not fully utilized and earned, pursuant to this Agreement during the Agreement period, shall be returned to the Commission, unless otherwise agreed. Furthermore, if the University fails to perform the duties as outlined herein; the University shall be required to repay any unearned funds received under this Agreement.
- i. This Agreement is not assignable without the express written approval of the Commission.
- j. This Agreement may be terminated by either of the parties hereto at any time by giving thirty (30) days advance written notice to the other party.
- k. The relationship of the Commission and the University, under this Agreement, shall be that of principal and independent contractor. It is understood by both the Commission and the University, that the University is not an employee of the Commission. It is understood that the Commission assumes no responsibility beyond those specifically stated in this Agreement.
- l. All provision of this Agreement are subject to the Americans with Disabilities Act.
- m. The University guarantees payment of compensation to injured workers according to the Nebraska Workers Compensation Act.

PERIODIC PROGRESS REPORTS:

The University shall provide the Commission with current year progress reports (written and verbal), at the November Research Planning meeting or upon request by the Commission. A final written summary will be submitted to the Commission at the conclusion of the project or April 1, 2014. The University shall publish the results of all Commission-funded research in The Bean Bag and provide electronic copies of research reports to the Commission for publication on the Commission web page.

TERMINATION/AMENDMENT

Whereas the parties to this agreement are both "agencies" of the State of Nebraska, this Agreement may be terminated by either party, upon sixty (60) days written notice, due to insufficient funding or appropriation. Revision or amendment of the Agreement may be made at any time upon written approval of the Commission and the University.

Approved:

7/11/13
Date

7/18/13
Date

NEBRASKA DRY BEAN COMMISSION

Wesley Ullrich
Wesley Ullrich, Chairman

**BOARD OF REGENTS OF THE
UNIVERSITY OF NEBRASKA**

Jeanne Wicks
Jeanne Wicks, Director
Sponsored Programs

Nebraska Dry Bean Commission
(Invited project proposal, Submitted to Ms. Lynn Reuter)

Project Title: Incorporating dry-edible beans into noodles to improve product nutritional value (Phase II)

Project coordinator/Principal Investigator:

Wajira S. Ratnayake, Ph.D. (Research Assistant Professor),
The Food Processing Center, 222 Food Industry Complex,
University of Nebraska-Lincoln, Lincoln, NE 68583-0930.
Tel. (402)472-2142, Fax. (402)472-1693, Email. wratnayake2@unl.edu

Project Purpose/Background:

Noodle, a widely consumed food product around the world, is prepared using a variety of raw material; wheat, rice, buckwheat, etc. The selection of raw material for noodle preparation depends on region, culture, and type/variety of product. The main ingredients in most noodle formulations are wheat flour, water and salt [1]. Depending on the type of noodles, other ingredients, such as egg, flavors, colors, and preservatives are also used, in relatively small amounts, in the formulations. As a result, the nutritional value of noodles is extremely low, compared to most other commonly consumed foods. Very limited research has been conducted on fortifying noodles formulations with legume-based ingredients to improve nutritional value. It has been found that the nutritional value of noodles could be improved by fortifying with garbanzo bean flour [2].

Nebraska-grown dry beans have not been tested in common food formulations, such as noodles. In our opinion, there is a very high possibility of using dry-edible bean-based ingredients in commercial noodles formulations, to improve the nutritional value of the product, specially in terms of improving protein and fiber contents. It is also important to note that successful research and development work in this area would create additional opportunities in international commerce for Nebraska dry-beans. For example, the rapid income growth has been changing the nature of food expenditure by consumers in China. With the increasing household income, there is a greater consumer demand for both quantity and higher quality food. Since mid-2000's, Chinese households are reaching a saturation point in the quantity of food consumed, and as a result, turning more towards higher quality foods [3].

In this proposed research, we (UNL Food Processing Center) plan to conduct investigations on utilizing dry-edible beans in noodles, which are commonly consumed as convenient foods. Our previous research has proved that Nebraska grown dry-beans, such as Great Northern bean [4], could be used for the proposed work. Improving the nutritional value of such commonly consumed products would benefit both the consumers (with improved nutrition) as well as dry-bean producers (additional income by exploiting new emerging markets for the commodity). Phase I of this project was completed by 02nd July 2012, prior to the arrival of reverse trade mission from China. The results of work conducted under Phase I will be used

Calendar of activities:

Activity	Time (Month)							
	1	2	3	4	5	6	7	8
Equipment setup, sample acquisition, preliminary testing**	X	X						
Preliminary testing on ingredient blends			X	X	X	X		
Product development and testing						X	X	X
Dissemination and publication of results								X

**Using the (proposed) newly acquired noodle manufacturing machine.
X = Time of specific activity.

Budget Narrative:

The Phase I of this project was previously funded by the Nebraska Department of Agriculture. Work performed under Phase I is excluded from this budget.

Category	NDA funds	Total
Personnel	\$10,182	\$10,182
Travel	\$1,000	\$1,000
Equipment	\$250	\$250
Supplies	\$3,568	\$3,568
Contractual		\$0
Indirect Costs		\$0
Total	\$15,000	\$15,000

We are requesting an amount of \$15,000 from the Nebraska Dry Bean Commission, for this project.

Travel:

To partially cover the expenses of project personnel attending the 2013 Institute of Food Technologists (IFT) annual meeting in Chicago (June 13-16) to present the project findings.

Equipment:

For operating supplies and maintenance of noodle manufacturing system.

Supplies:

The amount of \$3,568 requested for supplies will be utilized as follows:

Ingredients, formulation supplies, including gums and stabilizers ¹	\$1,250.00
Supplies/material for pilot plant operations ²	\$1,000.00
General laboratory supplies ³	\$1,318.00

¹Supplies required for bench-top formulations and product analyses.

²Ingredients, supplies, and consumable required for pilot plant processing operations.

³Include safety-ware for project personnel, cleaning supplies, and expenses involved with disposal of used materials/chemicals, etc.

FY 13-14 Promotion Projects

The NDBC, in conjunction with the Nebraska Department of Agriculture, hosted a four-member Chinese trade mission to participate in a workshop on dry edible bean powder as a food ingredient.

While visiting the University of Nebraska Food Processing Center, the group toured the UNL Food Processing Center pilot plant and laboratories and witnessed a demonstration on incorporating dry bean powder into dry (instant) noodles, and pinto bean and great northern bean powder incorporated into muffins and brownies.

This trade mission stems from a three year commitment by the Nebraska Dry Bean Commission to explore new world export markets for Nebraska grown dry beans.

The NDBC is encouraged to see representatives from two of the noodle companies visited during the first trade mission to China in 2010 are still interested in learning how to incorporate dry bean powder into Chinese instant noodles.

According to the World Instant Noodle Association, in 2012 China/Hong Kong was the fastest growing market for instant noodle cups in the world with a consumption of 44,030 million noodle cups consumed per day. The U.S. ranked #6 in the world with a mere consumption of 4,340 million noodle cups consumed per day. Considering the world consumption of instant noodle cups in 2012 was 101,420 billion cups per day and growing, the research by UNL is on the leading edge for incorporating dry bean powder into instant noodles.

Nebraska Dry Beans Feeding a Global Market



By Cindi Allen

Representing Nebraska and the dry bean industry, Cindi Allen of Ogallala, Nebraska and District IV Nebraska Dry Bean Commissioner of the Nebraska Dry Bean Commission, was one of the 3,800 exhibitors who attended the world's largest international food trade show. Feeding business in the global market Alimentaria 2014 closes its most international food trade show with 140,000 visitors, 30% of them from other countries. Alimentaria offers participating companies the opportunity to open or reinforce their presence in foreign markets, make trade contacts, capture new clients, promote loyalty among regular customers and generate new business.

Allen said, "Every two years, from March 21st to April 3rd, Alimentaria is the international business center for the latest trends in food and trade." The fair is an effective promotional platform.

Nebraska, a major producer of dry beans, was represented to trade visitors with power to make purchasing decisions; 72% make purchasing decisions or influence the decision to buy.

Drawing attention to dry beans and their place in the global market, U.S. Ambassador James Cotos held a press conference, while visiting the USA Dry Bean Exhibit, stressing the importance of the Transatlantic Trade and Investment Agreement

(TTIP), as well as U.S.-EU trade relations.

Cindi Allen attended a reception held at the US Consulate in Barcelona as an invited guest of US Ambassador James Cotos, and US Consul General Tanya Anderson. This gave Allen an opportunity to meet Foreign Agricultural Representative Robert Hanson as well as other US participants to the trade show. Allen said “It was a fast and furious four days. In the end the trade show was very prosperous for the dry bean industry, showcasing the variety and quality of our produces, initiating dozens of new buyer contacts, and reinforcing loyalty among others.”

The Nebraska Dry Bean Commission looks for opportunities to increase the consumption of beans, educate the consumer about the health benefits of beans, and continue to fund research that aligns with the goals of the Commission. NDBC has successfully participated in similar trade missions resulting in reverse trade missions and partnerships within the Chinese, Turkish, French, and South American markets. What is more, the Commission continues to be forwarding thinking creating a broader presence in domestic and international markets.

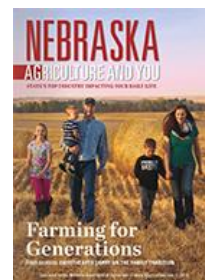
NDBC ADVERTISES IN 2014 NEBRASKA AGRICULTURE AND YOU

Nebraska Dry Bean Commission continued consumer education advertisement in the 2014 Nebraska Agriculture and You magazine.

The Nebraska Agriculture and You magazine is an annual publication highlighting Nebraska agricultural products and the producers who grow these products.

The Nebraska Agriculture and You magazine is distributed to medical and dental waiting rooms across Nebraska in an attempt to educate consumers about the State of Nebraska’s top industry and how agriculture impacts consumers daily lives.

2014 was the second edition of the Nebraska Agriculture and You magazine.



2013-14 NDBC domestic promotion programs

In 2013-14 the NDBC continued its efforts to support consumer education and promotion of Nebraska grown dry edible beans.

The programs supported included:

- Sponsorship of the Chef Judy weekly talk show on Lincoln radio station KLIN
- Oregon Trail Days chili cook-off dry bean competition held in Gering, NE
- Greater Omaha Barbeque Society “Best of Nebraska Beans” completion held in conjunction with the annual state barbeque competition
- Honky Tonk BBQ bean completion held at North Platte, NE

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