Growing your food is our passion.

Insider

Quarterly Newsletter
Winter 2015
Volume 3, Issue 1

A-FAN is back on the air!

A-FAN's radio campaign named "Diversification" is aimed at farmers and ranchers across Nebraska. The educational campaign produced in November is currently on the air. It includes three key messages about the importance of diversification. The spots feature mock interviews with UNL's Dr. Kate Brooks, producer Bart Beattie and banker Todd Johnson. Each spot focuses on different benefits of diversification. The three messages include: stabilizing the bottom line, expanding to bring back the next generation and improving soil quality with manure. Thirty second versions of the messages were also produced to increase frequency.

Over 1000 spots are scheduled between January 14th and February 13th on thirty-five stations across the state. Be sure to listen in May, as A-FAN will be on the air with a new campaign also focused on livestock development in Nebraska.

Nebraska Has the Resources in Place for Solid Livestock Expansion, A-FAN Stakeholders Told

There has never been a better time for animal agriculture in Nebraska, according to featured speakers at the annual AFAN stakeholders meeting November 24th in Lincoln.

Nebraska Corn Board Director Kelly Brunkhorst opened the meeting with a discussion about the importance of Nebraska's Golden Triangle, the state's combination of resources key to livestock production, including corn, soybeans and bio-fuels. These resources can be used to open the gate of opportunity for expansion of livestock production, he said.

> *The Golden Triangle: "We have water, land, corn soybeans, and distiller grains available."*
> *— Dr. Kate Brooks*

Willow Holoubek, Executive Director of A-FAN, presented an overview of the organization's work during 2014: a focus on livestock development issues and helping rural communities become more economically viable through growing animal agriculture in their areas.

"Unlocking the Gate of Opportunity with Livestock" was the theme of the keynote address by Dr. Kate Brooks, an extension livestock economist with the University of Nebraska-Lincoln. Dr. Brooks, an expert in the economics of meat and livestock production, said the "Golden Triangle" tools are in place for expansion of animal agriculture in the state. "We have water, land, corn, soybeans, and distiller grains available," she said. She shared statistics about beef, pork and dairy production over the last 20 years.

(continued on Page 2)

Dr. Kate Brooks, extension livestock economist with the University of Nebraska-Lincoln gave the keynote address, which looked at the latest statistics and trends in livestock production.

Executive Director of A-FAN, Willow Holoubek presented an overview of the organization's work focused on livestock development this past year.

Nebraska Has the Resources in Place for Solid Livestock Expansion, A-FAN Stakeholders Told *(continued from Page 1)*

Looking at where we have been and being able to look at current global trends about the consumption of protein, Dr. Brooks predicts that Nebraska will see growth in livestock production.

Dr. Brooks also explained that it is important on a personal level for producers to ask themselves if they have the knowledge, the management, the land and the money to expand their operations. She reminded the audience that "Nebraska has the tools in place for expansion, but it is a personal decision."

Kelly Brunkhorst, Director of the Nebraska Corn Board gave the opening remarks at the meeting.

AFAN stakeholder Ben Rice, of Prairieland Dairy, said he "was interested in the statistics shared by Dr. Brooks, showing how we have increased the amount of milk produced by each cow, despite the fact that Nebraska has fewer dairy cows than in the past. These are numbers that I will take back and share with others in the industry," he added.

Commenting on the meeting, Lisa Lunz, a soybean farmer from Wakefield, said the discussion "was a good reminder that livestock expansion is important for the economy of our state. We need to expand in order to keep our communities viable."

Prairieland's Rice agreed, saying that "opening the gates of opportunities is possible if we work together as an industry. As we learned today, Nebraska has the resources to thrive."

Following the presentations, attendee's enjoyed a buffet lunch sponsored by the Nebraska Soybean Board. The left-over food from the buffet was donated to Matt Talbot's Kitchen & Outreach.

Fourth Annual Husker Food Connection is set for April 16th

The 2015 Husker Food Connection is scheduled for April 16th at the North entrance of the Student Union on the UNL City Campus. In the case of bad weather, the event will be rescheduled on a date to be announced.

The purpose of the event is to promote agriculture to urban students and help them understand how their food is produced. Lucas Fricke, A-FAN intern in charge of organizing the event, says this year's event will focus on educating students about science in agriculture. Visitors will be able to learn what the term genetically modified means, which crops have modified seeds available, and the science behind the practice. Fricke added, "We hope to explain the science and build consumer trust in the science behind GMO technology."

Over 2,000 city campus students attended the event last spring, and organizers anticipate similar participation this year, according to Fricke. This year the Collegiate Farm Bureau club will work together with the Husker Food Connection group to organize the event. About 30 East Campus students are expected to volunteer to staff exhibits, serve free lunches and have conversations about agriculture with the city students.

Fricke is working to secure sponsors who will include ag-related businesses and other student organizations. If you are interested in sponsoring the Husker Food Connection event, please contact Lukas at lukasf@a-fan.org.

The food line at the 2014 "Husker Food Connection," which drew 2,000 campus students.

Keep Calm and Raise Livestock

For most, livestock production is in our blood. We are a select group that stands away from the herd and helps meet people's needs both down the road and across the globe. But, at times this livelihood we know and love is something that comes under heavy scrutiny.

More times than not, we as farmers, ranchers and supporters, use science when it comes to explaining our practices to the emotionally charged opposition at open hearings or public forms. Below are some pointers in responding to a critic or opposition.

Remember you're raising livestock for a reason. What is that reason?

- Use words like: **tradition, family values, history, opportunity, farm viability, diversification, community building, local, family based - rooted - grown - owned.**
- We know it is hard with the constant negativity surrounding your dream. BUT, hold tight and do what is right every single time. Consumers depend on us the producer, to stay focused and keep growing.
- Even though family farm continuation is important, remember that we do farm for a profit. Money is something that we all need, but don't make it the only thing you care about. Those animals are what you care about every single day, make sure that the opposition knows that we care for our animals out of respect and not just for a profit.

The environment is becoming a constant thought on many people's minds. Statements like, "manure will ruin our water, soil and air" can be daunting! Don't get caught up in the negativity. Below are some great thoughts about the element of nature we use daily.

- **Water:** One of our most precious resources is water. My family drinks it, my neighbors drink it and my animals drink it. WHY would I ever risk the chance to pollute the water that they drink!
- **Air:** I am happy with each breath of air that I take, why would I ever do something to make that less enjoyable to me? Facts show that energy production, driving of vehicles and metropolitan cities do more harm on the air than animal agriculture.
- **Land:** Here is simple math. Dirt + Seed + Water = food for my animals. Why would I ever try to ruin the soil that grows the food products for your family and mine? This answer is simple, I wouldn't.
- **Manure:** Animal manure is the best ORGANIC fertilizer in the world and is filled with vital nutrients that plants can use to grow. Most people use commercial fertilizers derived from foreign sourced refined products. The economics are simple; animal nutrients is efficient and can reduce input costs!

If the need for using facts arises you can always call us and we will get you the information you need. Our office number is 402.421.4416 or Willow's phone is 402.421.4455 or her cell 402.710.1110. Or email us at willowh@a-fan.org

Annual Triumph of Agriculture Expo will be March 11th and 12th

The 49th Annual Triumph of Agriculture Exposition will be held at the Centurylink Center Omaha, with over 200,000 square feet of exhibit space. This annual event, regarded as one of the largest indoor short line Farm Machinery Shows in the Midwest, is a diversified presentation of agricultural products and services. The timing of the show, before the planting season and spring fieldwork begin, has been ideal for the show's success each year. A-FAN will be exhibiting at the show. We hope to meet new partners and visit with those of you who make your rounds at the show. For more information about the show and its exhibitors visit http://www.showofficeonline.com/agexpo.htm.

Kids learned to husk corn at "A Day at the Farm" event at the Keyes farm.

Visiting families were able to inspect corn used to feed cattle, as well as to see cattle up close.

We'd love to hear from you!

If you prefer to receive your ***Insider*** via email please contact us at info@a-fan.org. Check out our Social Media sites or you can also contact us at:

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www.becomeafan.org/blog

A-FAN Partners with the Omaha Children's Museum

A-FAN and several other agricultural groups and organizations are partnering with the Omaha Children's Museum to present a community-engaged exhibit named Once Upon a Farm. The exhibit will remain open until April 12.

The museum is located at 500 South 20th Street in downtown Omaha.

"Our shared vision in creating this exhibit," said Lindy Hoyer, Executive Director of the Omaha Children's Museum," is to help the kids growing up in an urban environment make stronger connections to the origins of their food before it makes it to the shelves of the grocery store or farmers market."

"Once Upon a Farm" exhibit at the Omaha Children's Museum runs until April 12.

Touring families will enter the exhibit through barn doors. A-FAN's Barn Door brochure, which highlights the different forms of agriculture in Nebraska, will be available at the exhibit so families can continue the conversation at home about where their food comes from.

A-FAN also organized a "Day at the Farm" event November 8th. Five families were chosen to visit the Keyes Angus family farm near Springfield, Nebraska. The families had a fun-filled day of learning about where their food comes from, and were provided nutritious Nebraska-produced lunches and snacks. The families learned how to husk corn and were able to get up close to the Keyes' Angus cattle.

A special thank-you goes out to the Keyes family for being great hosts and opening up their farm to these families for this event.

This exhibit and the many activities that the Museum has planned provide a great opportunity for Nebraska families to explore the world of agriculture.

The Keyes family opened its farm, near Springfield, November 8 for A-FAN's "A Day at the Farm" Event. The Keyes family is shown here with the families who participated in the farm visit.

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: Stronger Together: Grow Nebraska Dairy Summit
Date: Tuesday, April 28, 2015 11:29:53 AM

From: A-FAN [mailto:willowh@a-fan.org]
Sent: Monday, April 27, 2015 3:53 PM
To: Schaneman, Royce
Subject: Stronger Together: Grow Nebraska Dairy Summit

Invitation to Attend

Phone: (888) 580-AFAN

Web: www.becomeafan.org

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Find us on YouTube

Follow our Blog

Thursday, May 7th, 2015

9:00 a.m. - 2:00p.m.

Registration and coffee at 8:30 a.m.

Embassy Suites

1040 P Street - Lincoln, NE 68508

Program Included

- **Welcome**
  - Ben Rice, Past FFA State Vice President
  - Rod Johnson, Nebraska State Dairy Association

- Greg Ibach, Nebraska Director of Agriculture

- **Stronger Together: Growing Dairy for Nebraska**
  - Mike Kruger, CEO, Midwest Dairy Association
  - Mary Wilcox, V.P. - Dairy Ingredient Marketing, Midwest Dairy Association
  - Bob Lefebvre, Sr. V.P. of Industry Relations, Midwest Dairy Association

- **Dairy Growth and Development Study**
  - Bobbie Kriz Wickham

- **Nebraska Livestock Expansion White Paper**
  - Chuck Hibberd, University of Nebraska, Dean of Extension

- **Grow Nebraska Dairy Update**
  - Willow Holoubek, Alliance for the Future of Agriculture in Nebraska
  - Rod Johnson, Nebraska State Dairy Association

- **Breakouts: Forging our Path Forward**
- **"I am the Future" with Brooke Engelman, Classic Dairy**
- **Closing Remarks by Governor Pete Ricketts**

Lunch and light refreshments will be available during the summit

Co-Facilitators:
Willow Holoubek, Alliance for the Future of Agriculture in Nebraska
Bobbie Kriz-Wickham, Nebraska Department of Agriculture
Rod Johnson, Nebraska State Dairy Association

RSVP

emilys@a-fan.org or 402-421-4416
by May 1, 2015

Hosted by Grow Nebraska Dairy

PO Box 84606

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Forward this email

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2015 Youth WMC Tour Evaluations

March 24-26, 2015

1. How was the schedule? Too many events? Too few events?
    a. I felt like the schedule was good, a lot of events but some free time too.
    b. It was really great! I was able to see the grain movement from start to finish, and it was especially beneficial to start with the tugboat tour so we could see the places that we talked about later. Towards the end it seemed to be a bit much, but I think we were all getting tired on that last day.
    c. Loved the schedule. Good number of events-especially enjoyed all of the outdoor/interactive activities.
    d. Schedule was perfect.
    e. Very good schedule. Busy with the right amount of free time.
2. What did you most enjoy?
    a. The morning at the wheat marketing center learning about the different tests and seeing the pilot scales.
    b. The tugboat ride.
    c. Loved the tugboat ride and learning about water transportation-something that we can't really do here in Nebraska.
    d. Tug boat ride.
    e. I enjoyed the tug boat ride. It was nice to see the places we were vsisiting the rest of the tour beforehand so that we could get our bearings.
3. What did you least enjoy?
    a. The last day, the speakers seemed to be somewhat repetive and it was tough to be engaged when it was all sitting and listening.
    b. Sitting and listening and being lectured to. It was engaging, but I was falling asleep.
    c. I enjoyed it all.
    d. The last lecture.
    e. The last day was a bit too much lecturing
4. Were the hotel and restaurants satisfactory? Need to be changed?
    a. Awesome.
    b. Yes! All very good and above my expectations!
    c. Hotel and restaurants were AWESOME! Don't change.
    d. Couldn't have been better don't change a thing,
    e. Hotel was phenomenal! Great food.
5. Is there anything else that you would like to see or do?
    a. For three days I thought we got the chance to see and do a lot .

    b. The ocean!
    c. If time was added to the trip, I would really like to take time to visit/tour the countryside. It would also be beneficial to have a couple of hours to explore downtown Portland to really get a feel for the culture.
    d. Possibly see some more farmland in Oregon.
    e. I would like to tour a farm.
6. Any additional comments?
    a. I had a great time and am really thankful for the opportunity to go to Portland.
    b. I absolutely loved this trip and thought it was really informative while being extremely fun.
    c. THANK YOU!!! This trip was fabulous, and I am so grateful for the opportunity to have learned so much in just a few days.
    d. Very, very thankful for the opportunity. I've been on lots of tours around the Midwest and this was so different from anything I've learned or experienced before. Thank you!!

BEFORE THE
SURFACE TRANSPORTATION BOARD

DOCKET NO. EP 724 (Sub-No. 4)

UNITED STATES RAIL SERVICE ISSUES –

PERFORMANCE DATA REPORTING

OPENING COMMENTS OF

ALLIANCE FOR RAIL COMPETITION
MONTANA WHEAT & BARLEY COMMITTEE
COLORADO WHEAT ADMINISTRATIVE COMMITTEE
IDAHO BARLEY COMMISSION
IDAHO GRAIN PRODUCERS ASSOCIATION
IDAHO WHEAT COMMISSION
MONTANA FARMERS UNION
NORTH DAKOTA GRAIN DEALERS ASSOCIATION
NEBRASKA WHEAT BOARD
OKLAHOMA WHEAT COMMISSION
OREGON WHEAT COMMISSION
SOUTH DAKOTA WHEAT COMMISSION
TEXAS WHEAT PRODUCERS BOARDUSA
DRY PEA AND LENTIL COUNCIL (USADPLC)
U.S. PEA AND LENTIL TRADE ASSOCIATION (USPLTA)
WASHINGTON GRAIN COMMISSION
WYOMING WHEAT MARKETING COMMISSION

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March 2, 2015

Alliance for Rail Competition ("ARC") and the other rail shipper interests identified on the cover of these Comments (collectively, "ARC, et al.") commend the STB for its efforts to address US rail service issues in recent months. ARC, et al. are convinced that that the severe problems experienced by rail shippers since 2013 would have been far worse if the STB had followed recommendations of BNSF and CP and had taken no action.

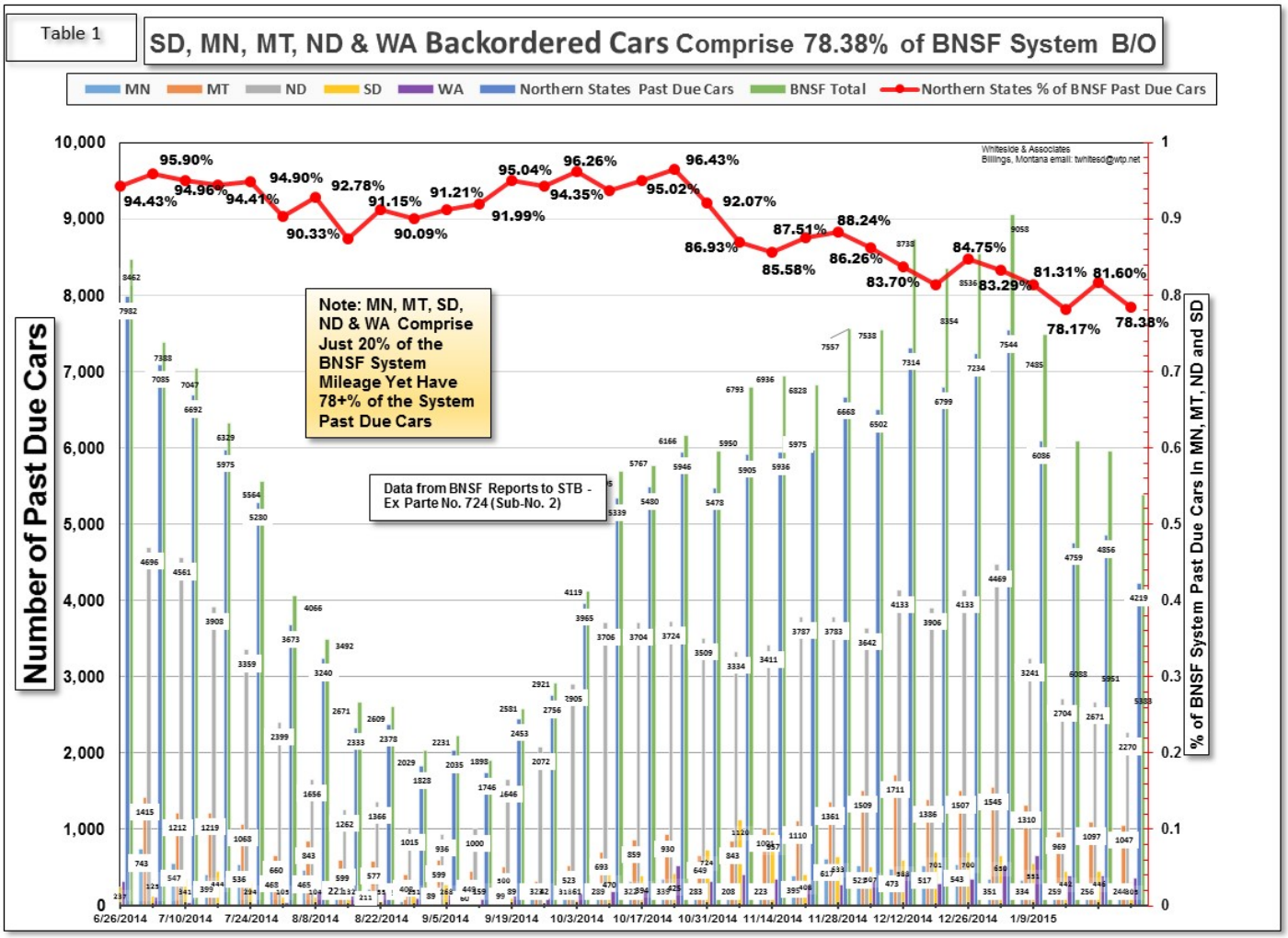
ARC, et al. include among their members shippers of coal and grain in unit trains and shuttle trains of 50 cars or more. There remains more work to do before rail service is adequate for such shippers, particularly in a tier of States in the West, from Minnesota to Washington. However, the service data reported to date, which the Board proposes to continue and regularize, has shown a welcome spotlight on problems that were otherwise known in broad outlines but not in the necessary detail.

However, ARC, et al. also represent captive and other rail dependent shippers whose shipments move in volumes of 49 cars or less. These include shipments of fertilizer, propane, sand used for fracking (including synthetic sand), oil, pipe, and pulse crops (beans, peas, lentils and the like). These shipments may move in single-car shipments or in multiple car shipments of less than 50 cars. While

reports of inadequate service, and resulting adverse impacts, have been plentiful, details are lacking because of the Board's focus in its reporting requirements on shipments of 50 cars or more.

ARC, et al. generally support the proposals for weekly reporting by Class I railroads of the data called for in the Board's Decision served December 30, 2014 in this proceeding. However, additional reporting is needed as to service problems involving shippers that are not able to ship in unit or shuttle train volumes of 50 cars or more.

In addition, while better reporting is a necessary part of addressing current service disruptions, data reporting is not, by itself, a sufficient regulatory response. Without the reports provided to date by the Class I railroads, we would not have the detailed information necessary to produce Table I, below, identifying not just the numbers of backordered cars on BNSF, but also their locations.



While the number of backordered cars on the BNSF system may have fallen, Table I shows that five States – Montana, Washington, North Dakota, South Dakota, and Minnesota – continue to suffer. In fact, though these States represent only 20% of BNSF's system mileage, shippers there account for over 78% of backordered cars. These data suggest that BNSF has elected to respond less vigorously to service problems affecting these States – among the most captive in

the US – than to problems affecting shippers in other States where competition is more effective and poor service is more likely to mean lost business.

The BNSF has just announced some of the largest freight rate increases in wheat freight rates in recent history –from $300 to over $760 per car (10¢ to over 20.5¢ per bushel – 9% up to 11.5+% respectively). This comes after 2 years of sub-standard service wherein the farm producers bore massive secondary market costs and a punishing basis because the railroad's car supply was so erratic.

Because many of the shipper interests represented by ARC, et al. are in the five most affected States, we would like to see BNSF do more to address these backordered car issues, as well as other service issues. And if BNSF's efforts continue to be inadequate in the States in question, further action by the STB, including but not limited to requests for more explanation by BNSF of its plans for corrective action, may be needed.

As the Board stated in its December 30, 2014 decision:

> The permanent collection of performance data on a weekly basis would allow continuity of the current reporting and improve the Board's ability to identify and help resolve future regional or national service disruptions more quickly, should they occur.

Decision at 3, emphasis added.

Regulatory action to help resolve regional service disruptions may be beyond the scope of this proceeding, whose focus is "Performance Data Reporting". However, reporting is a critical first step in identifying the scope of service disruptions. Without that step of data reporting, shippers and the Board will be handicapped, if not stymied, in efforts to develop appropriate responses.

For these reasons, ARC, et al. support the reporting the Board proposes to require for rail shipments of 50 cars or more, but the Board also needs to require additional reporting. Specifically, the Board should not, and cannot lawfully, assume that widespread and continuing rail service disruptions affect only "unit train" shipments.

If, as ARC, et al. believe and as Table I suggests, railroads like BNSF tend to work harder to address service problems affecting their most lucrative and/or least captive customers (with due regard for operational and network flow considerations), it is highly likely that smaller captive rail shippers will be low on the railroads' priority lists.

Not only is it theoretically likely that smaller captive customers are being injured by current rail service disruptions, and by BNSF's regional backordered car problems, but ARC, et al. have heard from such smaller shippers about their problems. These include sales opportunities lost, service requests delayed or

ignored, fertilizer and other input needs not met, and ripple effects as consignees are forced to look for other sources for goods that should have received timely rail service.

Simply stated, it appears that shuttle train shipments of wheat and unit train shipments of other commodities, at least in the West in recent months, have received a higher priority than shipments of 49 cars or less. However, without data reporting as to such smaller shipments, it is difficult to know how severe any service differentials may be. This lack of data makes it hard for shipper representatives to suggest remedial action. And it makes it hard for the Board to stay informed of problems and of progress, if any. More transparency is needed.

Nothing in the Act or in Board precedent renders smaller shipments and shippers unimportant. On the contrary, given Class I railroads' use of higher rates, poor service or both to discourage smaller shippers, it is particularly important for the Board to inform itself of such shippers' rail service problems.

As we have advised the Board in the past, the changing face of the agricultural commodity mix will require, now and in the future, rail service meeting smaller shipment priorities, reflecting current and projected production by farmers and other agricultural producers. The railroads must focus on a more diverse product mix going forward.

See generally the decision served April 26, 2013 in Docket No. 42124, State of Montana v. BNSF Railway Co., concerning tariff changes by BNSF challenged as to wheat shipments of 48 cars or less. Though the Board declined to find an unreasonable practice, it pointed out that "At the very heart of the common carrier obligation is the belief that railroads are in a position of unique public trust, and are therefore held to higher standards of responsibility than other private enterprises." Decision at 5, quoting GS Roofing Prods. Co. v. STB, 143 F.3d 387, 393 (8th Cir. 1998).

See also the Board's decision in State of Montana at page 1, note 2, where the Board warned against "functional" denials of service, defined as "circumstances in which the railroad purports to provide the service, but for whatever reason the service provided falls short of the railroad's common carrier obligation (e.g., because of unreasonable delay in providing the total number of cars requested by the shipper)". Also relevant here is the court's decision in National Grain and Feed Ass'n v. United States, 5 F.3d 306 (8th Cir. 1993):

> Evidence in the record suggests that non-COT shippers endure unreasonable delays in receiving car service during shortages. That these shippers might feasibly switch to premium tariff COT service is not the relevant inquiry; rather the Commission must determine if the COT program so affects the service for conventional shippers as to prevent or frustrate its ability to meet its common carrier obligations through that conventional service.

Put another way, the fact that a shipper is smaller and less able to afford premium prices does not make the railroad common carrier obligation inapplicable. At some point, unlawful functional denials of service to smaller shippers occur, and without better data, it is difficult or impossible to assess the extent to which this is taking place.

It is important to emphasize that ARC, et al. are not calling on the Board to remedy rail service problems being experienced as to smaller shipments. Rather, we are asking that the Board not turn a blind eye to those problems by excluding shipments of 49 cars or less from reporting requirements for Class I railroads. Consideration of remedies can await the availability of more data. However, that wait may turn out to be permanent if the Class Is are not required to provide any performance data as to any shipments in volumes of less than 49 cars.

What should be reported, beyond the unit train data the Board has proposed to require? ARC, et al. believe that, at a minimum, some additional reporting should be required as to shipments of less than 49 cars. Given modern computers and data processing, it may be that the easiest solution for Class I railroads is to report an all rail shipments. We are not in a position to assess the cost of such additional reporting, but it should not be too expensive, assuming the reports do not require special studies or the collection of data the railroads currently do not collect.

Conversely, assuming the railroads already collect data as to shipments of less than 49 cars that is identical to or similar to data being reported as to unit trains, reporting that data to the Board and customers is not too much to ask.

The Board has expressed a desire to minimize burdens on the Class I railroads. Decision at 3. ARC, et al. do not seek imposition of undue burdens, but small burdens should not be objectionable. It must be remembered that railroad service problems during the last 18 months or so have resulted in substantial burdens being imposed on many shippers, including many shippers represented by ARC, et al.

The railroads may nevertheless object to expanding their reports to cover all shipments, and to reporting on non-unit train shipments the same way they report on unit train shipments. Any such objections should be scrutinized carefully, since railroads may have motives other than burden concerns for concealing service problems for shipments of 49 cars or less.

In addition, if identical reporting for all shipments genuinely appears impracticable, there are many "middle ground" reporting arrangements between identical reporting for all shipments and no reporting for any shipments of 49 cars or less. For example, reports on service quality for smaller shipments might be

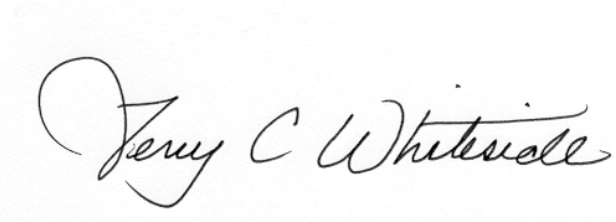
made monthly rather than weekly. This would still provide valuable data as to conditions and trends, and could highlight where more corrective action is needed.

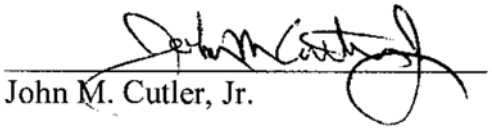
Another possibility would be to require reporting to include shipments of 49 cars or less in regions where service problems have been particularly acute, e.g., States west of the Mississippi, including Minnesota, much of which is west of the river. And if there are commodities that have not been affected or for which rail service is rare, the reporting requirements might exclude such commodities.

Finally, we would not be having this proceeding if Class I railroads had not misjudged demand for their services as the US recovers from a long economic slump. No one expects that railroad forecasting, investment and allocation of resources will always be perfect, but the recent service disruptions have been extraordinary, and cannot credibly be blamed on snow in the winter of 2013-14.

Railroads bear primary responsibility for recent service problems and the resulting harm to shippers. It is reasonable to ask the Class Is to report data showing their progress in returning to adequate service levels consistent with their statutory common carrier obligation, and such reporting must not exclude shipments of less than 50 cars.

Respectfully submitted,





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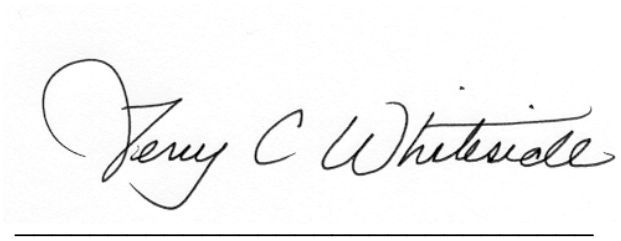
Attorney for ARC, et al

CERTIFICATE OF SERVICE

I hereby certify that I have this 2nd day of March, 2015, caused copies of the foregoing document to be served by first-class mail or by electronic means on all parties of record.



Terry Whiteside

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: Bio Nebraska April 2015 Newsletter
Date: Tuesday, April 28, 2015 11:48:46 AM

From: Phil Kozera [mailto:pkozera@bionebraska.org]
Sent: Tuesday, April 28, 2015 7:04 AM
To: Schaneman, Royce
Subject: Bio Nebraska April 2015 Newsletter

CLICK HERE TO VIEW IN A BROWSER

APRIL 2015

In this issue:

social buttons

Phil Kozera

Dear Members,

This month, I had the privilege to listen to Robb Fraley discuss new innovations necessary to meet the global food demand. Besides being the executive vice president and chief technology officer at Monsanto, Dr. Fraley is the winner of the 2013 World Food Prize. By 2050, there will be twice the demand for food, and meeting this demand will require significant innovation in agriculture. Nebraska research and industry are positioned to make an impact.

I want to congratulate Todd Sneller and his team at the Ethanol Board for their Ethanol 2015: Emerging Issues Forum. It provided an excellent opportunity to discuss the prospects that ethanol provides for urban and rural areas of Nebraska.

Phil Kozera

Executive Director

pkozera@bionebraska.org

Earlier this month, Josh Johnson from Benchmark Biolabs and Rachel Hurley from Monsanto joined me in Washington, D.C., where we met with Sen. Sasse, Rep. Fortenberry and Rep. Smith and with staff members for Sen. Fischer and Rep. Ashford. I appreciate their time to discuss issues impacting our industry, and their recognition of the significance of this industry and the quality jobs it produces in our state.

On the state level, we are excited about the progress for LB449. This legislation would increase the maximum amount of microloans that could be awarded annually from the Department of Economic Development. The program has helped entrepreneurs bridge the gap from concept to commercialization.

Finally, I want to give a last-minute reminder to RSVP for our 10th Anniversary Celebration on Thursday. Bio Nebraska's goal is to build a strong ecosystem for the life sciences by providing resources necessary for life science companies in Nebraska to grow and prosper. We plan to honor these accomplishments at 5 p.m. April 30 at the Nebraska Innovation Campus.

Sincerely,

Phil Kozera
Executive Director

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people graphic

BoyumEdison

Founded by Anna Boyum, Ph.D., BoyumEdison is an Omaha-based writing firm serving the biomedical industry. Companies in the biomedical industry create sophisticated technology, and their success depends on their ability to clearly communicate complex concepts that distinguish their offering. BoyumEdison helps them accomplish this goal.

The company has helped established businesses, startups, educational institutions, technology managers and nonprofit organizations promote their products and services, educate their customers and communicate with their employees and partners. Formats often used by the company include reports, continuing medical education materials and presentations.

A graduate of the University of Nebraska Medical Center, Boyum discovered her passion for writing about science and technology while working as a biomedical scientist. Over the years, she successfully developed, used, taught and marketed biomedical technology. “These experiences help me better understand the needs of our clients and gives me the ability to create content that fully meets these needs,” Boyum said.

An active member of the Nebraska biomedical community since 2006, Boyum has witnessed an impressive growth of the biomedical industry in the state. She founded BoyumEdison with a goal of supporting this growth. BoyumEdison aspires to be a trusted partner for Nebraska businesses in promoting biomedical technology developed in the state and in facilitating the dialog with consumers and industry players on regional and national levels.

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UNeMed to Host Tech Transfer Boot Camp
UNeMed is hosting a week-long boot camp training program to help prepare participants for a career in technology transfer. The course will meet mornings June 15-19. Admission is free; applications will be accepted through May 5. UNeMed

UNL’s Green New Interim Academic Affairs Head
Ronnie Green has been named interim senior vice chancellor for academic affairs at the University of Nebraska-Lincoln. In his new role, Green is UNL’s chief academic officer and would be in authority in the absence of the chancellor. Green also will continue in his role as the Harlan vice chancellor of the Institute of Agriculture and Natural Resources. UNL Newsroom

Ethanol’s Impact on Nebraska Detailed
As of June 2014, Nebraska’s ethanol industry hit a production capacity of 2,077 million gallons a year, employing 1,300 full-time employees at 24 plants, according to a UNL study. The state ships 96 percent of its ethanol out of the state, making Nebraska one of the largest exporters of bioenergy — and bringing in new dollars to the state’s economy. Nebraska Ethanol Board

Laboratory, Clinical Cooperation Continues at Munroe-Meyer Institute
Laboratory and clinical geneticists will continue to work closely together at the UNMC’s Munroe-Meyer Institute, say the new directors of the genetics operations. Ann Haskins Olney, M.D., is serving as interim director of the clinical genetics department and Tanner Hagelstrom, Ph.D., is interim director of the Human Genetics Laboratory. UNMC blog

EPA Agrees to RFS Calendar
The Environmental Protection Agency says it will issue proposed rules for the 2015 Renewal Fuel Standard by June 1, and final rules for both 2014 and 2015 by Nov. 30. Washington Post

Insurance Companies at Odds Over Genetic Testing
While demand for genetic testing has increased, insurance companies are declining to pay for multi-gene panel tests, saying they are unproven. But without insurance coverage of these tests, it may be difficult to obtain enough data to analyze their effectiveness. newsmax.com

Farm Group Supports FDA Authority for Food Labeling
The American Farm Bureau Federation reiterated its support for a bill that would give the U.S. Food and Drug Administration authority over the labeling of food containing genetically modified ingredients, creating a national standard and avoiding having states create different laws. Augusta Free Press

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Bio Nebraska 10th Anniversary Celebration
5-8 p.m., April 30
Nebraska Innovation Campus

Third Annual Bio Nebraska Golf Scramble
June 10
Quarry Oaks Golf Course, Ashland

BIO International Convention
June 15-18
Philadelphia

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Bio Nebraska footer graphic

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: Bio Nebraska March 2015 Newsletter
Date: Monday, April 27, 2015 12:10:04 PM

From: Bio Nebraska [mailto:pkozera@bionebraska.org]
Sent: Tuesday, March 31, 2015 7:05 AM
To: Schaneman, Royce
Subject: Bio Nebraska March 2015 Newsletter

CLICK HERE TO VIEW IN A BROWSER

MARCH 2015

In this issue:

social buttons

Phil Kozera

As an industry, Nebraska's bioscience community is diverse, sizable and growing. Since 2007, the bioscience industry has increased its employment base by 10 percent with more than 15,000 jobs and has an average starting salary of $58,357. Please join me and show your support by participating in Bio Nebraska's 10th Anniversary Celebration from 5 to 8 p.m. April 30 at the Nebraska Innovation Campus.

Besides being our 10th anniversary, this is the first year we will be joined by Gov. Pete Ricketts, who will be on hand to present the annual Governor's Bioscience Award. Please email me to confirm your reservation. For those not familiar with the campus, please enter through the NIC Conference Center entrance as indicated on the map.

Earlier this month, I had the opportunity to attend the Governor's Ag Conference in Kearney. There were several good discussions about the significance of agriculture in

Phil Kozera

Executive Director

pkozera@bionebraska.org

Nebraska but of particular interest was the discussion on value added agriculture by Randy Thelan, senior vice president of economic development for the Greater Omaha Chamber of Commerce. I think this represents a large opportunity for our state.

We are over the halfway point in the legislative session. While the Bioscience Impact Opportunity Act remains in committee, a few of the bills of interest to Bio Nebraska were placed on general file (several of these have been prioritized):

- LB156 changes the amount of tax credits under the Angel Investment Tax Credit
- LB226 authorizes crowdfunding as prescribed and exempts crowdfunding under the Securities Act of America
- LB246 redefines microbusiness under the Nebraska Advantage Microenterprise Tax Credit Act
- LB259 adopts the personal property relief act

On the federal level, Bio Nebraska is working with our elected officials to correct the flawed methodology in the proposed 2014 Renewable Fuel Standard (RFS) and issue a new proposal for 2014 and beyond that sets the RFS back on track. We are also monitoring the patent legislation. We believe that a balanced approach to patent legislation is critical to protecting innovation and will encourage businesses and universities to invest in research and development.

Finally, I will be among a small delegation from Nebraska traveling to Washington, D.C., in early April to participate in the BIO Fly-In and meet with our federal representatives. If there are issues or concerns that we need to address, please let me know.

Sincerely,

Phil Kozera
Executive Director

people graphic

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Green Plains Inc.

Headquartered in Omaha, Green Plains Inc. (Nasdaq: GPRE) is a diversified company with 850 employees spread across its business operations including ethanol production, corn oil production, grain handling and storage, cattle feedlot operations and commodity marketing and distribution services.

The company operates 12 ethanol plants including four in Nebraska: Atkinson, Central City, Ord and Wood River.

Green Plains considers Nebraska, as the third largest corn-producing state, to be a great location for the ethanol industry. The company's four plants combined buy approximately 115 million bushels of corn from local farmers and sell the 1 million tons of livestock feed produced to local cattle feeders.

Ethanol's impact on the state is significant. Not only does the industry supply fuel and food for livestock, the state's 24 ethanol plants have created about 1,300 well-paying jobs.

A 2004 startup, Green Plains was named Fortune's 8th fastest growing company in 2011. Net income in 2014 was $159.5 million, compared to $43.4 million in 2013. 2014 revenues reached $3.2 billion.

In addition to supporting the Renewable Fuel Standard, the company encourages Bio Nebraska and all Nebraskans to learn more about the impact ethanol has on the state and, in particular, to request higher ethanol blends at the pump.

The EPA has approved E15 (a blend of 15 percent ethanol) for use in cars 2001 and newer, and, according to the company, a move to higher blends like E15 would create additional savings to consumers and an economic benefit for the state.

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Paper Touts Importance of Life Sciences Industry to Nebraska
An editorial in the Omaha World-Herald called out the importance of the life sciences industry to Nebraska: "Biotech firms are opening up major opportunities for Nebraska. Over time, this innovative sector seems certain to grow in importance for all parts of the state." Omaha World-Herald

USDA Grants Safety Approval of Four VaxLiant Adjuvants
VaxLiant, a joint venture of Lincoln-based Benchmark Biolabs and AgriLabs of St. Joseph, Mo., secured U.S. approval for four ENABL adjuvants that can be added to vaccines to help improve cattle and swine immune response. The company, featured in a recent article in Animal Pharm, has received USDA approval for 10 adjuvants in the past year. Benchmark Biolabs

UNL Offers New Innovation Course
"Making for Innovation," a new course offered by the University of Nebraska-Lincoln encourages students to learn new technologies in the new Innovation Studio at the Nebraska

Innovation Campus. The course encourages hand-on problem solving as a path to innovation. UNL Newsroom

Omaha Biofuels Group Recycling Cooking Oil
The Omaha Biofuels Cooperative is collecting used cooking oils from churches and restaurants and is cleaning it up at its production facility in an industrial park in South Omaha. The oil is used to power vehicles owned by the co-op members. They say that any diesel car or truck manufactured in the past nine years can use the fuel. Omaha World-Herald

UNL Researchers Study New Drug Delivery Candidate
UNL researchers published a study in Biomedical Microdevices about the use of a custom nanoparticle made from zein, a corn-based protein, and citric acid that may deliver cancer drugs to the kidney. The research is important because it may mean this nanoparticle is a more effective drug delivery candidate than what is available now. UNL Newsroom

Report Lauds Economic Impact Made by State's Academic Medical Industry
Among its peers in similarly populated states, the academic medical industry in Nebraska has the largest economic impact on the communities it serves, according to the Association of American Medical Colleges. The Omaha market outperformed strong centers such as those in Rochester, N.Y., and Tucson, Ariz. Data from both the University of Nebraska Medical Center and Creighton University were included. UNMC Newsroom

USDA Predicts Lower Ethanol Demand for Corn
The USDA lowered the ethanol market's projected demand for U.S. corn by 50 million bushels, which is good news, according to the president of the National Corn Growers Association. It means the ethanol industry is becoming more efficient, he said. The USDA raised corn projections for feed use and exports. Brownfield Ag News

Small Minnesota Ethanol Plants Look to Innovate
Minnesota ethanol plants are facing head-on a problem common to older ethanol plants that annually produce less than 40 million gallons: inefficiencies of scale. "It's innovate or die," said the chief executive of one plant. One plant temporarily turned from corn to government-surplus sugar and plans to apply technology that promises to cut electric and natural gas bills by $800,000 annually. Minneapolis Star Tribune

Growth in Biotech Crops Seen Internationally
While the U.S. remains the No. 1 producer for biotech crops, the industry is rapidly growing in developing countries. These countries accounted for almost 53 percent of the total land planted globally in biotech crops, according to a report by the International Service for the Acquisition of Agri-biotech Applications. Twenty of the 28 countries that grow biotech crops are developing countries in Latin America, Africa and Asia. SciDev.net

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UNL Biotechnology/Life Sciences Seminar Series
“Integrating Biochemical Genomics and Quantitative Genetics to Balance the Nutritional Content of Plants”
Dr. Dean DellaPenna, Michigan State University
4 p.m., April 1
UNL Beadle Center

One Health Summit 2015
March 31-April 1
Union Station, Kansas City

Partnering for Growth Forum
Hosted by IowaBio
April 1
Des Moines Area Community College, Ankeny campus

Science Cafe
“Exotic Animal Nutrition”
Kelly Kappen
7 p.m., April 7
The Slowdown, 729 N. 14th St., Omaha

Nebraska Science Festival
April 10-18
Omaha, various locations

Scientific Research Career Fair
April 11
Harper Center, Creighton University

Science Cafe
“The Impact of Investing in Stem Cell Research: California’s Story”
C. Randal Mills, Ph.D.
7 p.m., April 13
Vega, 350 Canopy St., Lincoln

Bio Nebraska 10th Anniversary Celebration
5-8 p.m., April 30
Nebraska Innovation Campus

Third Annual Bio Nebraska Golf Scramble
June 10
Quarry Oaks Golf Course, Ashland

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Bio Nebraska footer graphic

Update Profile

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: CommonGround News - March 2015
Date: Monday, April 27, 2015 11:58:00 AM

From: CommonGround [mailto:info@findourcommonground.com]
Sent: Thursday, March 26, 2015 3:27 PM
To: Schaneman, Royce
Subject: CommonGround News - March 2015

MARCH 2015

Clicking on attached links will in some instances take you away from USB-funded information.

A GROWING MOVEMENT

CommonGround has proudly been growing year after year with new farm women from multiple states across the country. Now with more than 130 volunteers, CommonGround is training these women to start impactful conversations with urban consumers about how their food is raised.

More than 40 CommonGround volunteers recently attended the fifth annual CommonGround conference in Austin, Texas, where they networked, heard the latest United States Farmers and Ranchers Alliance (USFRA) research from chairwoman Nancy Kavazanjian, attended a writing seminar, heard from USFRA Faces of Farming participant Katie Pratt and learned best practices when connecting with consumers through social media. Nearly half of the attendees were new to CommonGround.

At a separate event, two trainers from the Center for Food Integrity (CFI) hosted a media-training session for 12 CommonGround farmers in order to prepare them for future national media interviews. The ladies participated in mock interviews and learned what to expect during an on-air interview.

“I always appreciate the opportunity to hone my skills,” said Kansas volunteer LaVell Winsor. “It was helpful to hear the other

(April - June 2015)

April 1 - Colorado Academy of Nutritionist and Dieticians Conference (CAND)

April 1 - Zest and Zing - Wichita, Kansas

April 1 - Ameritas Health and Wellness Fair - Lincoln, Nebraska

April 27 - 14th Annual Women's Night Out - Mankato, Minnesota

June 1 - Western Kansas Chef's Tour

June 1 - Mom on the Farm Dinner - Missouri

(February - March)

February 20 - Twin Cities Women's Expo - Minneapolis, Minnesota

volunteers during the mock interviews. We want the media and consumers to look at CommonGround volunteers as their go-to resource about farming and food.

“The better that we are at communicating with media and consumers, the more likely they will be to come to us with their questions and concerns.”

SUSTAINABLE TALK

Sustainability is just one of the many topics consumers are concerned about when it comes to farming in the United States. To help address those concerns, four CommonGround volunteers – Kristie Swenson, Minnesota; Joan Ruskamp, Nebraska; Kellie Blair, Iowa; and Kim Bremmer, Wisconsin – traveled to New York City on March 17, the day before National Agriculture Day.

They discussed farming for the future and practices they use to improve our food and preserve our land and waterways. “I think it is so important for conventional farmers to define sustainable farming,” said Bremmer. “For the most part, the topic of sustainability is only being told by niche markets. During these interviews, we shared the important role that technology and GMOs play on conventional farms. We put a new face on sustainable farming.”

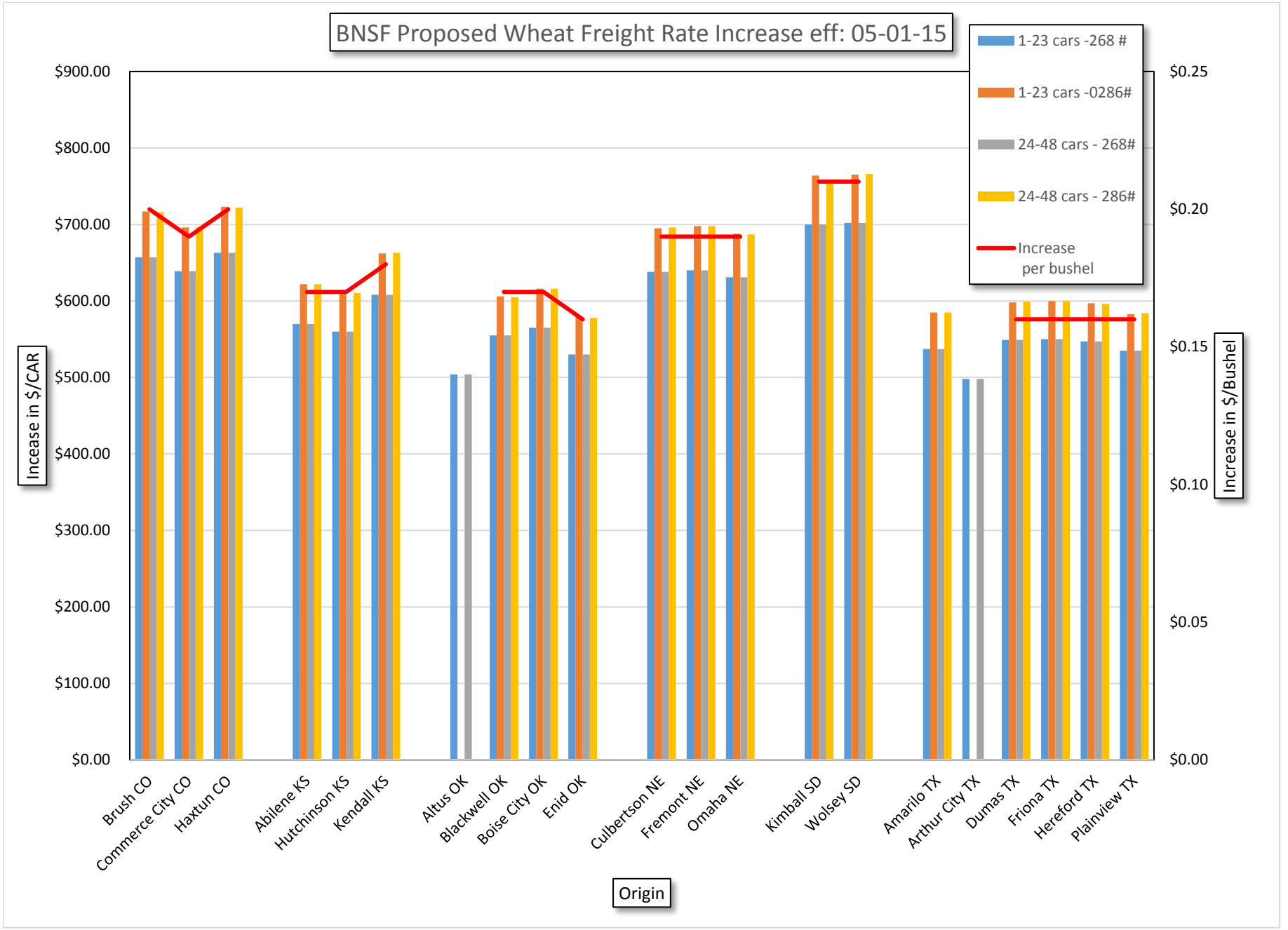
The volunteers were able to connect with 14 television and 11 radio outlets from across the country, including New York; Minneapolis,; Tampa, Florida; and Kansas City, Missouri.

CommonGround will to continue reaching out to consumers across the country through the media and in other ways to connect U.S. farmers to the family table.

March 21 - Central Minnesota Wellness Expo - St. Cloud, Minnesota

March 24 - Kentucky Academy of Nutrition and Dietetics - Louisville, Kentucky

by


BNSF Proposed Wheat Freight Rate Increase eff: 05-01-15
1-23 cars -268 #
1-23 cars -0286#
24-48 cars - 268#
24-48 cars - 286#
Increase per bushel
Incease in $/CAR
Increase in $/Bushel
$900.00
$800.00
$700.00
$600.00
$500.00
$400.00
$300.00
$200.00
$100.00
$0.00
$0.25
$0.20
$0.15
$0.10
$0.05
$0.00
Brush CO
Commerce City CO
Haxtun CO
Abilene KS
Hutchinson KS
Kendall KS
Altus OK
Blackwell OK
Boise City OK
Enid OK
Culbertson NE
Fremont NE
Omaha NE
Kimball SD
Wolsey SD
Amarilo TX
Arthur City TX
Dumas TX
Friona TX
Hereford TX
Plainview TX
Origin

current rates to the gulf	268	286	268	286
	1-23 cars	1-23 cars	24-48 cars	24-48 cars
Brush CO	$ 4,938.00	$ 5,382.00	$ 4,888.00	$ 5,328.00
Commerce City CO	$ 4,898.00	$ 5,339.00	$ 4,848.00	$ 5,284.00
Haxtun CO	$ 5,057.00	$ 5,512.00	$ 5,007.00	$ 5,458.00
Abilene KS	$ 4,431.00	$ 4,830.00	$ 4,381.00	$ 4,775.00
Hutchinson KS	$ 4,350.00	$ 4,742.00	$ 4,300.00	$ 4,687.00
Kendall KS	$ 4,730.00	$ 5,156.00	$ 4,680.00	$ 5,101.00
Altus OK	$ 4,080.00		$ 4,030.00	
Blackwell OK	$ 4,414.00	$ 4,811.00	$ 4,364.00	$ 4,757.00
Boise City OK	$ 4,723.00	$ 5,148.00	$ 4,673.00	$ 5,094.00
Enid OK	$ 4,227.00	$ 4,607.00	$ 4,177.00	$ 4,553.00
Culbertson NE	$ 5,008.00	$ 5,459.00	$ 4,958.00	$ 5,404.00
Fremont NE	$ 4,860.00	$ 5,297.00	$ 4,810.00	$ 5,243.00
Omaha NE	$ 4,648.00	$ 5,066.00	$ 4,598.00	$ 5,012.00
Kimball SD	$ 5,431.00	$ 5,919.00	$ 5,381.00	$ 5,869.00
Wolsey SD	$ 5,410.00	$ 5,897.00	$ 5,360.00	$ 5,842.00
Amarilo TX	$ 4,534.00	$ 4,942.00	$ 4,484.00	$ 4,888.00
Arthur City TX	$ 3,933.00		$ 3,883.00	
Dumas TX	$ 4,551.00	$ 4,961.00	$ 4,501.00	$ 4,906.00
Friona TX	$ 4,430.00	$ 4,829.00	$ 4,380.00	$ 4,774.00
Hereford TX	$ 4,423.00	$ 4,821.00	$ 4,373.00	$ 4,767.00
Plainview TX	$ 4,410.00	$ 4,807.00	$ 4,360.00	$ 4,752.00
add on	$ 100.00	$ 109.00	$ 100.00	$ 109.00

		286	286				
Montana to PNW Dometic Shuttle	Current	pending	increase per car	Increase per bushel	miles to pnw	Fuel decrease cents per bushel January to March

Billings	$ 3,887.00	$ 4,294.00	$ 407.00	$ 0.11	968	0.04
Carter	$ 3,848.00	$ 4,228.00	$ 380.00	$ 0.10	854	0.04
Chester	$ 3,726.00	$ 4,095.00	$ 369.00	$ 0.10	773	0.03
collins	$ 3,762.00	$ 4,133.00	$ 371.00	$ 0.10	784	0.03
conrad	$ 3,691.00	$ 4,053.00	$ 362.00	$ 0.10	761	0.03
culbertson	$ 4,750.00	$ 5,155.00	$ 405.00	$ 0.11	1084	0.05
glendive	$ 4,752.00	$ 5,211.00	$ 459.00	$ 0.13	1190	0.05
great falls	$ 3,787.00	$ 4,161.00	$ 374.00	$ 0.10	825	0.04
grove	$ 3,886.00	$ 4,279.00	$ 393.00	$ 0.11	914	0.04
harlem	$ 4,035.00	$ 4,427.00	$ 392.00	$ 0.11	870	0.04
havre	$ 3,924.00	$ 4,306.00	$ 382.00	$ 0.10	836	0.04
kasa point	$ 4,547.00	$ 4,976.00	$ 429.00	$ 0.12	1031	0.04
kershaw	$ 3,870.00	$ 4,253.00	$ 383.00	$ 0.10	865	0.04
kintyre	$ 4,441.00	$ 4,865.00	$ 424.00	$ 0.12	1004	0.04
macon	$ 4,557.00	$ 4,987.00	$ 430.00	$ 0.12	1034	0.05
merc		$ 5,323.00			1150	0.05
moore	$ 3,922.00	$ 4,320.00	$ 398.00	$ 0.11	933	0.04
pompeys pillar	$ 3,925.00	$ 4,339.00	$ 414.00	$ 0.11	999	0.04
rudyard	$ 3,794.00	$ 4,167.00	$ 373.00	$ 0.10	794	0.03
shelby	$ 3,590.00	$ 3,949.00	$ 359.00	$ 0.10	730	0.03
sweet grass	$ 3,590.00	$ 3,957.00	$ 367.00	$ 0.10	769	0.03
tunis	$ 3,859.00	$ 4,241.00	$ 382.00	$ 0.10	913	0.04

Pending rates 5-1-15 to the gulf	268	286	268	286
	1-23 cars	1-23 cars	24-48 cars	24-48 cars
Brush CO	$ 5,595.00	$ 6,099.00	$ 5,545.00	$ 6,044.00
Commerce City CO	$ 5,537.00	$ 6,035.00	$ 5,487.00	$ 5,981.00
Haxtun CO	$ 5,720.00	$ 6,235.00	$ 5,670.00	$ 6,180.00
Abilene KS	$ 5,001.00	$ 5,452.00	$ 4,951.00	$ 5,397.00
Hutchinson KS	$ 4,910.00	$ 5,352.00	$ 4,860.00	$ 5,297.00
Kendall KS	$ 5,338.00	$ 5,818.00	$ 5,288.00	$ 5,764.00
Altus OK	$ 4,584.00	$ 4,997.00	$ 4,534.00	$ 4,943.00
Blackwell OK	$ 4,969.00	$ 5,417.00	$ 4,919.00	$ 5,362.00
Boise City OK	$ 5,288.00	$ 5,764.00	$ 5,238.00	$ 5,710.00
Enid Ok	$ 4,757.00	$ 5,186.00	$ 4,707.00	$ 5,131.00
Culbertson NE	$ 5,646.00	$ 6,154.00	$ 5,596.00	$ 6,100.00
Fremont NE	$ 5,500.00	$ 5,995.00	$ 5,450.00	$ 5,941.00
Omaha NE	$ 5,279.00	$ 5,754.00	$ 5,229.00	$ 5,699.00
Kimball SD	$ 6,131.00	$ 6,683.00	$ 6,081.00	$ 6,628.00
Wolsey SD	$ 6,112.00	$ 6,662.00	$ 6,062.00	$ 6,608.00
Amarilo TX	$ 5,071.00	$ 5,527.00	$ 5,021.00	$ 5,473.00
Arthur City TX	$ 4,431.00	$ 4,830.00	$ 4,381.00	$ 4,775.00
Dumas TX	$ 5,100.00	$ 5,559.00	$ 5,050.00	$ 5,505.00
Friona TX	$ 4,980.00	$ 5,429.00	$ 4,930.00	$ 5,374.00
Hereford TX	$ 4,970.00	$ 5,418.00	$ 4,920.00	$ 5,363.00
Plainview TX	$ 4,945.00	$ 5,390.00	$ 4,895.00	$ 5,336.00
add on	$ 100.00	$ 109.00	$ 100.00	$ 109.00

difference between rate increase and fuel decrease per bushel

current export

difference between domestic and export current

0.07	3778	$	(109.00)
0.07	3739	$	(109.00)
0.07	3617	$	(109.00)
0.07	3653	$	(109.00)
0.07	3578	$	(113.00)
0.06	4605	$	(145.00)
0.07	4643	$	(109.00)
0.07	3678	$	(109.00)
0.07	3777	$	(109.00)
0.07	3926	$	(109.00)
0.07	3815	$	(109.00)
0.07	4438	$	(109.00)
0.07	3761	$	(109.00)
0.07	4332	$	(109.00)
0.07	4448	$	(109.00)
	4758		
0.07	3813	$	(109.00)
0.07	3816	$	(109.00)
0.07	3685	$	(109.00)
0.07	3481	$	(109.00)
0.07	3481	$	(109.00)
0.06	3750	$	(109.00)

Rate increase 5-1-15	268	286	268	286	Increase per bushel
$ Per car	1-23 cars	1-23 cars	24-48 cars	24-48 cars	
Brush CO	$ 657.00	$ 717.00	$ 657.00	$ 716.00	$ 0.20
Commerce City CO	$ 639.00	$ 696.00	$ 639.00	$ 697.00	$ 0.19
Haxtun CO	$ 663.00	$ 723.00	$ 663.00	$ 722.00	$ 0.20
Abilene KS	$ 570.00	$ 622.00	$ 570.00	$ 622.00	$ 0.17
Hutchinson KS	$ 560.00	$ 610.00	$ 560.00	$ 610.00	$ 0.17
Kendall KS	$ 608.00	$ 662.00	$ 608.00	$ 663.00	$ 0.18
Altus OK	$ 504.00		$ 504.00		
Blackwell OK	$ 555.00	$ 606.00	$ 555.00	$ 605.00	$ 0.17
Boise City OK	$ 565.00	$ 616.00	$ 565.00	$ 616.00	$ 0.17
Enid OK	$ 530.00	$ 579.00	$ 530.00	$ 578.00	$ 0.16
Culbertson NE	$ 638.00	$ 695.00	$ 638.00	$ 696.00	$ 0.19
Fremont NE	$ 640.00	$ 698.00	$ 640.00	$ 698.00	$ 0.19
Omaha NE	$ 631.00	$ 688.00	$ 631.00	$ 687.00	$ 0.19
Kimball SD	$ 700.00	$ 764.00	$ 700.00	$ 759.00	$ 0.21
Wolsey SD	$ 702.00	$ 765.00	$ 702.00	$ 766.00	$ 0.21
Amarilo TX	$ 537.00	$ 585.00	$ 537.00	$ 585.00	$ 0.16
Arthur City TX	$ 498.00		$ 498.00		
Dumas TX	$ 549.00	$ 598.00	$ 549.00	$ 599.00	$ 0.16
Friona TX	$ 550.00	$ 600.00	$ 550.00	$ 600.00	$ 0.16
Hereford TX	$ 547.00	$ 597.00	$ 547.00	$ 596.00	$ 0.16
Plainview TX	$ 535.00	$ 583.00	$ 535.00	$ 584.00	$ 0.16

Rate increase 5-1-15	268	286	268	286	Increase per bushel

Rate increase 5-1-15	1-23 cars -2	1-23 cars -02	24-48 cars - 26	24-48 cars - 2	Increase per bushel
Brush CO	$657.00	$717.00	$657.00	$716.00	$0.20
Commerce City CO	$639.00	$696.00	$639.00	$697.00	$0.19
Haxtun CO	$663.00	$723.00	$663.00	$722.00	$0.20
Abilene KS	$570.00	$622.00	$570.00	$622.00	$0.17
Hutchinson KS	$560.00	$610.00	$560.00	$610.00	$0.17
Kendall KS	$608.00	$662.00	$608.00	$663.00	$0.18
Altus OK	$504.00		$504.00		
Blackwell OK	$555.00	$606.00	$555.00	$605.00	$0.17
Boise City OK	$565.00	$616.00	$565.00	$616.00	$0.17
Enid OK	$530.00	$579.00	$530.00	$578.00	$0.16
Culbertson NE	$638.00	$695.00	$638.00	$696.00	$0.19
Fremont NE	$640.00	$698.00	$640.00	$698.00	$0.19
Omaha NE	$631.00	$688.00	$631.00	$687.00	$0.19
Kimball SD	$700.00	$764.00	$700.00	$759.00	$0.21
Wolsey SD	$702.00	$765.00	$702.00	$766.00	$0.21
Amarilo TX	$537.00	$585.00	$537.00	$585.00	$0.16
Arthur City TX	$498.00		$498.00		
Dumas TX	$549.00	$598.00	$549.00	$599.00	$0.16
Friona TX	$550.00	$600.00	$550.00	$600.00	$0.16
Hereford TX	$547.00	$597.00	$547.00	$596.00	$0.16
Plainview TX	$535.00	$583.00	$535.00	$584.00	$0.16

miles to gulf	Fuel decrease cents per bushel January to March	difference between rate increase and fuel decrease per bushel
1117	0.05	$ 0.15
1038	0.05	$ 0.14
1184	0.05	$ 0.15
768	0.03	$ 0.14
727	0.03	$ 0.13
911	0.04	$ 0.14
666	0.03	$ 0.14
719	0.03	$ 0.14
557	0.02	$ 0.13
1003	0.04	$ 0.15
1052	0.05	$ 0.14
1009	0.04	$ 0.14
1308	0.06	$ 0.15
1322	0.06	$ 0.15
597	0.03	$ 0.13
649	0.03	$ 0.14
664	0.03	$ 0.13
683	0.03	$ 0.13
598	0.03	$ 0.13

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: April News from the Nebraska FFA Foundation
Date: Monday, April 27, 2015 4:49:04 PM

From: Stacey Agnew, Nebraska FFA Foundation [mailto:information@neffafoundation.org]
Sent: Wednesday, April 15, 2015 8:01 AM
To: Schaneman, Royce
Subject: April News from the Nebraska FFA Foundation

DONATE

True Blue Nebraska News

April 2015

Dear Royce,

We are so grateful for your support as Nebraska FFA State Convention came to a close last Friday. Almost 4,000 FFA members attended State FFA Convention this year. Your support through sponsorships and donations, volunteering and sharing the FFA message with your community last week was greatly appreciated. With your help we provided quality leadership programming, contests and recognition and an educational and fun experience for students who will be leaders in our communities.

Each year at State FFA Convention, the Foundation is honored to present an award to an outstanding agriculture teacher. This award goes to a teacher who has gone above and beyond the required duties of an ag teacher and is named after a former Board member, Gary Scharf, who was a victim of an Omaha mall shooting.

This year, our selection committee was honored to choose Mark Schroeder, agriculture teacher at Wisner-Pilfer High School. He showed significant contributions to his school, agriculture education program and community, especially following the Pilger tornadoes of last summer. Learn more about why Mark was so deserving of this award by clicking here.

Finally, if you were unable to attend convention, here's a great video with reflections from students and a great showcase of the new location and events at the 2015 State FFA Convention. I hope this leaves you refreshed and encouraged to make an impact on future generations. Enjoy!

Sincerely,

Stacey Agnew
Executive Director

"I Believe in the Future of Ag" raises nearly $480,000

Last August, 20 corporate sponsors challenged Nebraska's FFA members to raise $250,000 at the local level. The results are in and Nebraska's FFA chapters rose to the challenge. The "I Believe in the Future of Ag" campaign educates the public on the importance of agricultural education in Nebraska's schools through an educational marketing campaign and serves as a fundraising campaign to grow the capacity of Nebraska FFA at both the state and local levels.

Want to read the full story on this year's campaign, including a success story at McCool Junction? Hop over to our blog.

On the Blog...

2015-16 Nebraska FFA Officers Announced

And just like that, Nebraska's FFA Convention has come and gone! We are so grateful for another great convention celebrating student successes and... Read More.

Badertscher Family Establishes Endowment for Nebraska FFA

Joining FFA was one of the best thing that happened to Braden Badertscher. "He always had a love for agriculture," according to his parents... Read More.

Get Connected

300 Agricultural Hall, Lincoln, NE · 402.472.5224

Forward this email

Nebraska FFA Foundation | 300 Ag Hall | Lincoln | NE | 68583-0709

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: March News from the Nebraska FFA Foundation
Date: Monday, April 27, 2015 11:30:46 AM

From: Stacey Agnew, Nebraska FFA Foundation [mailto:information@neffafoundation.org]
Sent: Sunday, March 15, 2015 8:01 AM
To: Schaneman, Royce
Subject: March News from the Nebraska FFA Foundation

DONATE

True Blue Nebraska News

March 2015

Dear Royce,

It's mid-March and the Nebraska FFA Association and Foundation offices are buzzing with State Convention planning. In case you didn't already have your calendars marked, convention will kick off Wednesday April 8th and run through April 10th this year. I can't wait to see the faces of students being recognized for another year of hard work.

As I look through my to-do list for this year's convention, it's evident that your support will not go unnoticed at this year's convention. You're helping:

- award 478 students with a State FFA Degree;
- support 52 proficiency awards areas, 19 career development events, and 10 leadership skills events;
- give back over $200,000 to local FFA chapters as part of the I Believe in the Future of Ag campaign;
- and support countless leadership workshops and behind the scenes activities that make a significant impact on over 4,000 members and guests who attend Nebraska's State FFA Convention.

There are a lot of changes this year, so be sure to read our blog post about State Convention activities. All the general sessions will be streamed live and you can follow along on Facebook and Twitter to see a few of the highlights of convention.

Thanks for supporting Nebraska's FFA members and watch for some of the State Convention results from us next month in the April issue of True Blue Nebraska News.

Sincerely,

Stacey Agnew
Executive Director

Support Nebraska FFA and 4-H at the Golf Classic

Gather up few friends and join us on the golf course on June 22nd for the 21st Annual FFA & 4-H Golf Classic.

We had great time at Indian Creek Golf Course in Omaha last year and we're headed back there this year. The event is a great opportunity to gather with fellow FFA and 4-H supporters, meet the new State FFA Officers and 4-H Ambassadors.

A golf team at the 2014 Classic stopped to pose with a State FFA Officer and 4-H Ambassador.

Your $250 registration includes an 18-hole round of golf, with lunch, cart, range balls, and dinner. All proceeds are split between the Nebraska FFA Foundation and Nebraska 4-H Foundation and support statewide programs.

Contact Stacey at stacey@neffafoundation.org or 402-472-5224 for more information.

On the Blog...

2015 Nebraska FFA State Convention Preview - Live a Legacy

It's that time of year again, State Convention is right around the corner! This year there are a lot of new and exciting changes...

Meet Your State Officer: Paige Dexter

This post is the last in our series of Nebraska FFA Officers where you get to know the 2014-15 team. This month, let's meet State President Paige

Read More.

Dexter...
Read More.

Get Connected

300 Agricultural Hall, Lincoln, NE · 402.472.5224

Forward this email

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: From the Governor"s Weekly Newspaper Column
Date: Monday, April 27, 2015 10:53:59 AM

From: Roth, Steve
Sent: Thursday, March 12, 2015 11:37 AM
To: Schaneman, Royce
Subject: FW: From the Governor's Weekly Newspaper Column

Ag producer Brent Robertson has also witnessed how Nebraskans can play a role in developing ag markets around the world. Robertson represented the Nebraska Wheat Board at last week's conference, and reported that 50 percent of Nebraska's wheat crop is exported to other countries, including Japan, Nigeria, Brazil and Mexico. Robertson visited millers and food processers in Nigeria last year, and just months later, hosted the same group on his Elsie farm. Fostering these relationships secures markets for Nebraska commodities, and exposes global producers to Nebraska's technology-based production and conservation methods.

http://beatricedailysun.com/news/opinion/editorial/growing-exports-importing-opportunity/article_3e698d8d-e98a-546b-a34c-68646db3497a.html

Steve Roth
Nebraska Department of Agriculture
Ag Promotion Coordinator - Policy Analyst
(402) 471-6861
steve.roth@nebraska.gov

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: GFF Update
Date: Tuesday, April 28, 2015 10:32:17 AM

From: Erin Ball [mailto:eball@grainsfoundation.org]
Sent: Tuesday, April 21, 2015 10:32 AM
To: Schaneman, Royce
Subject: GFF Update

4-21-2015

GFF Highlights

Another Conference Acceptance!

GFF is going to Milan, Italy for the Grains for Feeding the World conference July 1-3, 2015.

We are thrilled about this opportunity for a few reasons:

- It is a conference focused broadly on grains and provides an opportunity to showcase GFF's research on an international scale; the audience is more diverse than at other conferences we will attend this summer.
- It is a new event (first year) at which GFF can really establish a relationship from the onset and grow for years to come
- Given the timing of the conference, that it is held during one of the most anticipated food events in the world, EXPO MILANO 2015, both Grains for Feeding the World and Expo Milano will be receiving international media visibility, which means that there could be potential interest for GFF and as well as opening doors for future business and research alliance opportunities.

For a rundown of all of GFF's conference participation over the next several months, please click here.

Next Investor Call Thursday, May 7

GFF's next investor conference call will be Thursday, May 7, 1 p.m. CT/2 p.m. ET. Mark your calendar now, invite your team, and plan to attend! Call-in credentials and materials will follow in a separate message early that week.

Trend Report

Dietary Guidelines Advisory Committee Report

Please click here for an overview of the DGAC report, analysis, and media response.

News Clippings

50 Shades of Grey in Nutrition
US News Eat + Run Blog, 4/17/15
Despite the soundbites often provided in the media about healthy eating, nutrition is not an absolute science. Nutrition writer Janet Helm gives 5 bits of nutrition advice where readers should find middle ground. One of these is the oft-cited recommendation to "avoid refined grains."

What Happens When a Dietitian Needs Help with Nutrition?
Food & Nutrition Magazine, 4/17/15
A registered dietitian shares her experience living with rheumatoid arthritis and exercise-induced anaphylaxis, and coming to the conclusion she felt better following the gluten-free diet.

Afternoon Snacks Ruining Your Teeth And Advice From Dentists On What To Eat Instead
Huffington Post, 4/17/15
How the working week wreaks havoc on your diet, and more so on your teeth, and what you can do to avoid this havoc.

What the FDA's warning to KIND bars really means
Fox News, 4/17/15
Experts weigh in on the FDA's letter to KIND LLC, accusing the company of "misbranding" in its use of the word "healthy" on its packaging for four specific flavors.

Physicians urge Columbia University to cut its ties with Dr. Oz
Washington Post, 4/16/15
A group of physicians sent a public letter to the medical dean at Columbia University requesting the institution dismiss Dr. Oz as a faculty member given his storied history of sharing unfounded advice on his TV show.

Build A Better Sandwich
The New York Times, 4/15/15
Why restaurant sandwiches are seemingly better than the sandwiches you make at home, and what experts are saying on how you can make a better sandwich.

A High-Fat Diet Can Torpedo Your Metabolism
SHAPE, 4/14/15
High-fat diets may be trendy, but are not the healthiest causing the metabolism to slow down.

How To Keep The Carbs And Still Lose The Pounds
YAHOO! Health, 4/15/15
Latest science says that not all carbs are created equal, and why you should include carbs in your diet to help shed pounds.

Expert Shares Tips for Baking with Whole Grains
The Whole Grains Council, 4/15/15
Baking tips from baking expert, P.J. Hamel.

'Food Babe' Debacle Underscored Crisis of Credibility Surrounding What We Eat
ADWEEK, 4/15/15
A look into the changing world of food marketing and why consumers are more trusting of influencers than big brands/advertising agencies.

A field Guide to the American Sandwich
The New York Times, 4/14/15
A celebration of the sandwich, and an attempt to create a taxonomy for its many diverse forms.

6 Surprising Results of Going Gluten-Free
Huffington Post, 4/14/15
Going gluten-free has tremendous health benefits for celiacs, but there are surprising other ways in which going gluten-free can impact your lifestyle.

Justin Rose says Novak Djokovic-style gluten-free diet behind good Masters showing
ESPN, 4/14/15
Why switching to a gluten-free diet is the reason behind his turn in fortunes - including a second-place finish at the Masters last week.

Not all District 2014 students on board with healthy lunch standards
Chicago Tribune, 4/14/15
Healthier nutrition standards cause younger students in Indian Prairie School District 204 to bring their own lunches to school and older students to quit buying snack at lunch, according to a report presented to the School Board. New district standards state that all buns, wraps, pizza crusts and bakery goods must be made of 100 percent whole grain.

Understanding the Power Brand Phenomenon
Hartman Group, 4/14/15
Brands whose position in food culture have allowed otherwise dated brands to remain contemporary and to continue to drive profit growth

Why the FDA Has Never Looked at Some Additives in Our Food
NPR, 4/14/15
Authored by the Center for Public Integrity, this article explains the rules in place that governs GRAS status for food additives.

Spreadable Sausage to Give Your Sandwich a Kick
The New York Times, 4/13/15
A spreadable, spicy sausage from Calabria in southern Italy, is now being produced in Iowa as an American-made version - a mix of prosciutto and speck with a non-nonsense picante quotient. It comes in five-ounce links, ideal for layering on your next grilled cheese, BLT or egg salad sandwich.

Don't Mess With My Bacon, Egg and Cheese

The New York Times, 4/13/15
A look into the classic bacon, egg and cheese sandwich that is treasured, but rarely spoken of.

What's more natural: Paleo diets or GMOs?
Genetic Literacy Project, 4/13/15
What constitutes "natural"? Today consumers are taught that paleo diet is the single set of natural foods. But is the paleo diet more natural than GMOs?

Researchers propose link between gluten and ALS
Reuters, 4/13/15
Researchers from Israel believe sensitivity to gluten may cause a syndrome that looks like ALS in a preliminary and single report.

Popular diets may carry risks that are unexpected and not worth taking
The Washington Post, 4/13/15
Widely publicized (or fad) diets may seem promising, but science seldom supports their claims.

This Pantry Staple May Add Years To Your Life
Huffington Post, 4/13/15
Although "grains" and "flour" are dirty words for some eater today, research continues to support the associated benefits of fiber-rich whole grains.

Senza Glutine: Gluten-Free New York Girl Eats Italy
Huffington Post, 4/13/15
A writer's interpretation of visiting Italy as a gluten-free individual 7 years ago, and her thoughts on what that experience would look like now with gluten-free eating more common.

Foods High in nickel Linked to Obesity in Some Women
The Wall Street Journal, 4/13/15
Avoiding foods that contain nickel significantly decreased body-mass index in overweight women allergic to the metal.

Popular diets may carry risks that are unexpected and not worth taking
Washington Post, 4/13/15
This Consumer Reports-authored article evaluates three diet trends - high-protein, low-fat and gluten-free - to provide readers with a rundown of "the promise" vs. "the truth" for each.

Is Carbo-Loading a Terrible Idea? A Sports Dietitian Answers Your Questions
BostInno, 4/13/15
With the upcoming Boston Marathon next week, an Abbott sports RD offers guidelines for pre- and post-race nutrition, with a special focus on carbohydrate consumption.

Eating to Break 100: Longevity Diet Tips from The Blue Zones
NPR, 4/11/15
"The Blue Zones Solution" is a new book that dives further into the lifestyle practices of the 5 areas of the earth (The Blue Zones) where there are the highest concentrations of centenarians. While many of the factors the author identifies that are tied to a long life are not diet-related, the article provides "top longevity foods" from each of these five places, a number of which are grain-based.

How to Build a More Healthful Sandwich

YAHOO! Health, 4/13/15
A look beyond the basic (and boring) turkey on white bread sandwich, and into making brown-bagging it better than ever.

5 White Foods You Should Be Eating
YAHOO! Health, 4/13/15
It's time to think outside the red, orange, yellow, green, blue, indigo, and violet foods in your produce drawer and take a big bit of white - according to this article.

Eating cheese may help you lose weight, new study finds
The Independent, 4/13/15
New scientific study suggests that eating cheese may help individuals struggling to lose weight - and contribute to keeping the pounds off.

Make a delicious grilled cheese and bacon sandwich
The Today Show, 4/13/15
New York City chef Josh Capon joins TODAY to show us how to make the perfect grilled cheese sandwich with Monterey Jack, cheddar and Swiss cheeses.

The 5 Carbs You Should Be Eating Before The Big Race
Huffington Post, 4/12/15
Carbs are not only nutritious in the days leading up to a big race like a marathon, they're essential.

10 Questions With Science Babe, the Blogger Who Took Down Food Babe
BostInno, 4/11/15
Yvette d'Entremont, the Science Babe, tackles the Food Babe and her sugar-shaming, detoxing and gluten-free ways.

Spoiler Alert: New USDA App Helps Fights Food Waste
Modern Farmer, 4/10/15
The USDA estimates that 21 percent of food consumers buy goes to waste. It's bad for our bodies, bad for our wallets, and bad for the planet. Instead of just telling us, the USDA released an app for iPhone and Android that it hopes will help solve the problem by sending us alerts when food is about to go bad.

How Did Hamburger Buns Get Their Seeds?
Huffington Post, 4/10/15
Billions of dollars' worth of hamburger buns are sold every year, yet hardly anyone gives them a second thought. A look at the early history of the hamburger bun and its evolution over time.

The 10 Healthiest Foods For Your Gut
YAHOO! Health, 4/9/15
From probiotics, to fiber, this list of foods will have you feeling healthier and balanced.

Grain Foods Foundation | 1300 I Street NW | Suite 700W | Washington | DC | 20005

From:	Schaneman, Royce
To:	Wheat-Board, Intern
Subject:	FW: Global Consulting Project
Date:	Monday, April 27, 2015 10:12:59 AM
Attachments:	MBA Global Consulting Project Explanation Letter-2.pdf

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From: Kristi Block [mailto:block.kris@gmail.com]
Sent: Saturday, February 28, 2015 5:38 PM
To: Schaneman, Royce
Subject: Global Consulting Project

Royce,

As you may or may not know, I am pursuing a Master of Business Administration degree through Midland University. I am about half way through the program, and we have been talking about final projects- a global business consulting project. I was hoping you could put me in contact with someone maybe in US Wheat Associates or with the Wheat Marketing Center or maybe the Department of Agriculture. I would really like the opportunity to go abroad as part of this project.

The project is pretty open ended as to what we would need to do. It would be for free and there would most likely be four to six people working on the project. I am attaching a letter from the director of our MBA program, Raymond Sass, that outlines kind of what they are looking for.

I know its been a couple years, since I was in the office and I thought you might know best who to reach out to. Any help is greatly appreciated.

Also, I saw that Rick was recognized for 2014 Outstanding Service to Panhandle Agricultural Awards tell him congrats.

If you have any more questions, let me know. Again thanks for your help. I hope everything at the board is going great.

Have a Great Weekend

--
Kristi Block

BEATRICE DAILY SUN

Growing exports, importing opportunity

MARCH 12, 2015 4:00 AM • BY GOV. PETE RICKETTS

Last week, I joined more than 300 Nebraskans to talk about the future of Nebraska agriculture at my Governor's Ag Conference in Kearney. For nearly two days, experts shared ideas about successful farm transitions, value-added agriculture, and bridging Nebraska's urban-rural divide. The conference also focused on growing Nebraska's exports, which is a top priority in my administration.

Nebraskans need to be strategic and aggressive about trade opportunities to grow our state. My budget recommendation provides for additional funding for export trade missions in both the Department of Agriculture and the Department of Economic Development. In my administration, these departments will work more closely together than ever before.

Nebraska's Ag exports brought in $6.6 billion dollars in 2013. Between 2005 and 2014, Nebraskans participated in nine trade missions. The Nebraska Department of Agriculture and USDA work hand in hand to facilitate these projects.

The USDA Foreign Agricultural Service holds nearly 100 offices in 82 countries around the world. Mike Dwyer serves as Director of the Global Policy Analysis Division and spoke with Nebraskans at last week's conference. He predicts growth within the middle class in regions like China, Latin America, and Southeast Asia may one day lead to a greater demand for Nebraska commodities. As disposable income grows globally, our foreign partners will have more to spend on Nebraska's high quality protein, like beef, pork and chicken, as well as grains like soybeans, ethanol, and processed consumer foods.

As production of these crops continues, America must also expedite the trade negotiation process. Last week, I joined Nebraska Ag Director Greg Ibach and groups across Nebraska in an effort to push forward legislation in Washington to grant Trade Promotion Authority to the President. Trade Promotion Authority has the ability to put America in stronger positions to negotiate with other nations, as well as promote American products in new markets. TPA has been granted to every American President by Congress since 1974 to better secure trade agreements with foreign markets. TPA expired in 2007. Reinstating TPA is another way to stimulate our economy and Grow Nebraska by streamlining our abilities to strike trade deals.

At last week's conference, I met with a group of 50 Nebraskans who represent groups promoting Nebraska's many ag-based products, including beef, ethanol, poultry, dairy, wheat, and beans. These advocates of agriculture are proactive, innovative, and promote our state's many commodities. Cindi Allen, of the Nebraska Dry Bean Commission (NDBC), is a great example. Cindi spoke on behalf of the commission at the conference. Cindi and her husband, Doug, grow dry beans on their farm in Keith County, as well as corn, wheat, and sunflowers. Her work within the NDBC continues to preserve dry bean markets in South and Central America, Europe, the Caribbean, Asia, and Africa. She recently met with leaders at the U.N.'s World Food Program in Rome, to explore ways to develop Nebraska exports with a humanitarian presence in emerging markets. Nebraska is now the 3rd largest producer of dry beans in the U.S.

Ag producer Brent Robertson has also witnessed how Nebraskans can play a role in developing ag markets around the world. Robertson represented the Nebraska Wheat Board at last week's conference, and reported that 50 percent of Nebraska's wheat crop is exported to other countries, including Japan, Nigeria, Brazil and Mexico. Robertson visited millers and food

processers in Nigeria last year, and just months later, hosted the same group on his Elsie farm. Fostering these relationships secures markets for Nebraska commodities, and exposes global producers to Nebraska's technology-based production and conservation methods.

As Nebraska continues to focus on building new trade relationships overseas, I'm also working with the Nebraska Department of Agriculture to advocate our products domestically. On April 9 and 10, Director Ibach and I will join producers for a trade promotion trip. The event will feature Nebraska beef at three New York City restaurants, including Burger & Lobster, Empire Steakhouse, and Bull and Bear Prime Steakhouse, which was once frequented by Buffalo Bill Cody. Promotion activities are also planned at Ottomanelli Butcher Shop.

As your Governor, I am proud to promote the products grown by producers on Nebraska's thousands of farms and ranches. Expanding our ag exports not only promotes Nebraska's number one industry, it also protects our way of life.

As agriculture continues to evolve, my administration welcomes new ideas from those of you in every corner of our great state. I look forward to working with each and every one of you to grow agriculture and Grow Nebraska.

As always, you are welcome to contact my office at (402) 471-2244, or by email at pete.ricketts@nebraska.gov.

Digital/Web-site Report HomeBaking.org

HomeBaking.org

January – March 2015

Traffic: January: 33,197 / February: 48,139 / March: 37,590 / **Total**: 118,926

Duration of visit: Average Time 00:04:30 (National Average 02:30-04:30)

New visitors: New Visits 74% (National Average 72%)

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eNewsletter Communications:

Open Rate: *The current open rate is 19%. We have consistently remained above the national average of 15% for the majority of our newsletter broadcasts throughout 2014/15.*

Current Subscribers: 24,866

Social Media by the numbers:

Facebook members (1,848)

Broadcasts (233)

Twitter Members (1,306)

Blog views (98,332)

Youtube views (113,689)

Pinterest Pins (11,302)

Most popular posts this quarter Included:

Bake for Family Fun Announcement: Feb 1, 2015

Bake & Take: March 20th, 2015

Pie Making Tips: Jan 10th, 2015

Youtube Numbers Expanded:

Top Videos

Cornbread: 27,992 views

Quilt Cake: 27,998 views

Preheating An Oven: 13,683 views

Definition of "Folding" 9,636

All Purpose Flour: 9,991

Through a partnership with the Topeka television program Moms Everyday, we added a video clip entitled Forgotten Cookies for Bake for Family Fun Month. In addition, over the next several weeks we will be adding video clips from our Dough Sculpting 101 DVD to further expand our online collection.

Website Recipe Content:

<u>47 new recipes were added to the website during this quarter</u>. These member recipes were promoted in the newsletter, press releases, Facebook and Twitter – resulting in increased traffic to the site. An additional 64 recipes were mentioned via social media alone.

Top Search Terms

1. HomeBaking.org
2. Baking
3. Educator Award
4. Cookie Recipes
5. Pie Recipes
6. Gluten Free
7. King Arthur
8. Pizza Dough
9. Baking with Friends
10. Scratch Baking

Top Page Views

1. BFFFM Homepage
2. Web-site Homepage
3. Educator Resources
4. Recipes Homepage
5. Home Baker's Blog
6. Newsletter Archive
7. Glossary
8. DIY Baking Channel
9. Shopping Cart
10. Portable Kitchen

Top Referring Websites

1. Google.com
2. Facebook.com
3. Youtube.com
4. ParentsAsTeachers.org
5. KSWheat.com
6. UCLA.edu
7. Clabbergirl.com
8. Sugar.org
9. ClabberGirl.com
10. NEAFCS.com

Bake for Family Fun Month:

Twitter: 25 Posts made during BFFFM resulted in over 27,000 impressions

Facebook: 27 posts were made during BFFFM which resulted in over 49,000 impressions

40% of traffic to HomeBaking.org was directly related to BFFFM

The BFFFM section of the website has undergone extensive revision to include resources from every HBA Member. Also, past BFFFM content has been archived and is viewable by visitors, thereby maximizing visibility for member provided content.

Official BFFFM Press Release:

Feb 1st Release: Home Baking Association Baking Activities and Recipes for Bake for Family Fun Month

Full Page Reads: 2,417 (Content page opened and read by visitor)

Headline Impressions: 19,661,011 (How many visitors viewed the headline)

Online Pick-up: 21 (Story picked-up and rebroadcast on a blog or news site)

BFFFM Photo Contest:

Each week during Bake for Family Fun Month (February 2015) visitors to the HBA web-site and Facebook pages were invited to submit photos of their students or families baking together. Each week, HBA selected their favorite photo, and the winner received a prize pack consisting of HBA and member resources.

Between Facebook, Twitter and the HBA Blog, over 121,000 impressions were made with posts pertaining to the contest.

PROGRAM COMMITTEE REPORT
April 9, 2015

Committee: Tom Payne, Chairman/First Vice-President Program
Donna Cook Staff: Sharon Davis, Charlene Patton

#7702 Digital/Web-site Program

Web-site HomeBaking.org: (Additional Project Report provided)

- Traffic: January – March 118,926
- Average visit time 00:04:30 minutes (National Average 02:30-4:30)
- E-newsletter subscribers – 24,866

PROJECT BUDGET: $4,700 PROJECT TO DATE COST: $38.09

#7703 Educator Award

- Separate project report provided.

PROJECT BUDGET: $3,550 PROJECT TO DATE COST: $0

#7704 Dough Sculpting 101 DVD

- Mailed a Dough Sculpting 101 DVD to all HBA Member representatives with member pricing/$20 per DVD
- Included reminder in mailing of other HBA resources available for Trade shows, fairs, etc. (guide cards, etc)
- DVD featured in 2015 NASCO Family and Consumer Sciences Catalog; 90,000 printed
- Includes revised Lab 12 Dough Sculpting of Baker's Dozen Labs and additional resources
- DVD will be featured on web-site, e-newsletter and targeted releases to educator audiences

HBA Member Support: $12,000 TOTAL HBA PROJECT COST: $9,420.73

#7705 Promotional Materials/NASCO Advertising

NASCO's *Family & Consumer Sciences* on-line FCS Lessons

- Features HBA's *Dough Sculpting 101* DVD
- Davis prepared two lessons
- NASCO designed and will print new HBA lessons- Middle School *Bread with a Twist* and High School *Dough Sculpting 101* for 2015 FCS conferences
- FCS lessons are loaded and archived at www.eNASCO.com http://bit.ly/1PcrbRN
- HBA will also be able to use the lesson plans on HomeBaking.org
- Past HBA lessons = 1000+ downloads, @ reach 150,000+ students

NASCO's *Family & Consumer Sciences 2015 Catalog*

- Dough Sculpting DVD, HBA logo and QR Code links to sample video featured in special ad enhancement on inside cover of catalog
- HBA items featured in catalog A Baker's Dozen Labs/59 and Dough Sculpting101, Baking 101 CD and Baker's Dozen DVD/62
- NASCO printed 90,000 catalogs; 77,313 catalogs mailed to post secondary schools in culinary and hospitality to 2,000 schools across the country. Remainder for tradeshow distribution
- PROJECT BUDGET: FY15 $1,000.00 PROJECT COST: $1,000.00

#7711 Educator Partners

Kansas Parents as Teachers

- 25th anniversary **Kansas Parents as Teachers** state conference, Topeka, KS, March 2-3, 2015
- KPATA professionals serve 75+ school districts in Kansas.
- HBA resource sales - $200
- HBA provided an exhibit and a 75-minute workshop, *Math, Science and Literacy Never Tasted so Good* for
  - 200+ PAT educators attended the conference
  - 62 educators participated in workshop, exhibit and/or signed up for e-newsletter
  - ParentsasTeachers.org is a "Top-Ten HomeBaking.org referring web-site"

PROJECT BUDGET: $0 TOTAL PROJECT COST: $ 0

Kansas Unified Family & Consumer Sciences Conference

- March 5-6, Wichita, KS included an HBA exhibit
- HBA resource sales - $117.21
- Provided 175 Kansas educators with HBA packets, e-newsletter sign-up and resources. Special thanks to Lori Patton for her assistance!

Region V Association of Career and Tech Educators

- April 16-18, Overland Park, KS.
- Sixteen state region: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Kansas, Montana, Nebraska, Nevada, North Dakota, Oregon, S. Dakota, Utah, Washington, Wyoming plus Am. Samoa, Guam and Phillippines
- HBA exhibits two days and workshop *Baking Builds STE(A)M* –Friday April 18
- Estimate 150-200 FCS, Culinary and Early Childhood Career & Tech educators

FCCLA

- Program Committee recommending not participating in National Leadership Conference July 5-9, Washington DC

Teen Times online magazine

- HBA featured in April http://issuu.com/fccla/docs/magazine_27c9a437d5744d/1 .

HBA Joins *FCCLA@theTable* Resource Directory

- FCCLA Executive Director, Sandy Spavone shared at goals at annual meeting "Family, Career and Community Leaders of America (FCCLA) is launching a national campaign – FCCLA@TheTable – asking its 200,000+ members to take a pledge to plan and prepare healthy meals for their families. Goal: 70,000 meals pledged before the 2015 National Leadership Conference, where states with the greatest percentage of pledged meals will be recognized.

- HBA featuring FCCLA@theTable in the March e-newsletter, April web-site and blog posts
- In April HBA will be featured at http://www.fcclainc.org/content/fccla-at-the-table/
- HBA preparing resource directory to launch in April: *HBA Joins FCCLA@theTable* including members' food prep and meal-building resources for home meals--bread basket, breakfast, entrées and desserts (Member Opportunity #3)
- HBA members are encouraged to co-promote FCCLA@theTable.

Contact: Heather Davis, Partnership Coordinator, T: 703/706-4900 X339 E: hdavis@fcclainc.org
PROJECT BUDGET: $0 TOTAL PROJECT COST: $ 0

Boys & Girls Clubs

- 2015 pilots begin with BGC Manhattan, KS
  - March 27 first 2015 pilot teen Portable Kitchen workshop Chocolate Whole Grain Waffles were prepared by 18 teens, 3 leaders
  - May 1, Flat Breads/Wrap
  - Summer: Identify 3-5 teen/staff leaders; outline/create portable kitchen "how to" video clips on-line

PROJECT BUDGET: $0 TOTAL PROJECT COST: $ 0

Writers Guild

- Connie Evers, MS,RD,LD Author How to Teach Nutrition to Kids; speaker 2014 HBA Annual Meeting Provided material for web-site

Partners

Whole Grains Council

- After discussing the potential for WGC membership has requested HBA work with them as a Partner similar to Wheat Foods Council. Four program elements goals were discussed for development:

1. Logos and links to share resources on respective web-sites
2. Guest E-news features, blogs and social media posts (Ex: April 1, Whole Grain Sampling Day)
3. Baking Glossary whole grain baking ingredient definition additions/links
4. Co-development of an educator resource, such as *Whole Grain Baking 101* Power point.

Contact: Kelly Toups, MS, RD ktoups@wholegrainscouncil.org

Upcoming projects/events and Face-to-Face Opportunities:

- ACTE-Region IV/April 15-18, Overland Park, KS
- Festival of Breads/Workshop & Exhibit/June 13, Manhattan, KS
- Texas FCS Teachers Conference/July 28-30, Dallas
  Exhibit and Workshop/pending
  Reach - 250,000 households
  Funding Support: Texas Wheat Board

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: Bread with a Twist: Soft Pretzels
Date: Tuesday, April 28, 2015 11:24:47 AM

From: Home Baking Association [mailto:HomeBakingAssociation=gmail.com@mail70.atl31.mcdlv.net] **On Behalf Of** Home Baking Association
Sent: Sunday, April 26, 2015 3:58 PM
To: Schaneman, Royce
Subject: Bread with a Twist: Soft Pretzels

Perpetuating new generations of home bakers... View this email in your browser

Bread with a Twist: Soft Pretzels

April 26th is National Pretzel Day!

Blend history and science with baking as you share these lessons for making soft pretzels, dough sculpting and learning more about whole grains!

Bread with a Twist is a fun dough shaping multi-age lesson. The soft whole wheat pretzel recipe meets the Smart snack guidelines!

Dough Sculpting 101 DVD!

If you enjoy shaping pretzels, you'll love this DVD! Dough sculpting is fun for all ages! This DVD includes recipes, lessons, down loadable resources and more than 30 how-to-videos for shaping rolls, loaves, pretzels, cookies and sculpting directions for alligator, turtle, flag, turkey and more! Dough sculpting will add that extra value for bake sales too! Whether you need ideas for after-school programs, youth meetings, classrooms, community programs or for family fun….you will find lessons, recipes and ideas perfect for any occasion!

Check out the DVD, and sample video clips here
(Sample clips provided by HBA Members Argo Corn Starch and Kansas Wheat)

HBA Supports FCCLA

The Home Baking Association and its 34 members are supporting FCCLA@TheTable! Family, Career and Community Leaders of America (FCCLA) launched a national campaign rich with research and resources at FCCLA@TheTable. Preparing and eating more meals at home is a proven strategy, offering multiple benefits. Cooking and baking at home DOES matter!

Find resources, recipes and ideas for family meals, provided by the Home Baking Association!

Welcome: Whole Grains Council

The Home Baking Association is pleased to welcome the Whole Grains Council as a partner! HBA is excited to share resources from the Whole Grains Council. For more information, click here

What Is A Whole Grain? PDF available in both Spanish and English

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Spring baking may just be the best of all with so many things to celebrate! With gardens going in or growing up, rhubarb and strawberries galore and markets bursting with fresh ingredients, anyone can find something yummy to bake and share at spring events. Some spring "picks" just to get started:

Asparagus Quiche done quicker than a rabbit's tail by simply adding 1 cup diced fresh asparagus to a biscuit mix Breakfast Quiche recipe.

Carrot-shaped Cake Cookies are perfect for parties or family fun. Click here for a step-by-step pictorial guide. If you're looking for the right "orange" for sugar or frosting or a rainbow of color options, check out the Rainbow Sugar Resource

Another must-mix or guest gift is Carrot Cake Muffins by Rabbit Creek Gourmet Mixes.

Simplicity in a recipe is the Carrot Cake in a Cookie

Make it a "book and bake" time with young friends or children. They'll love baking carrot treats and reading Curious George The Perfect Carrot to double the fun.

Check out all things rhubarb by those who know it best—Minnesotans! You'll find breads, cobblers, crisps and of course--a wonderful strawberry rhubarb pie!

Strawberries make the perfect quick dessert or brunch item. From Strawberries and Cream Coffeecake to Ruby Crowned Cake Royale there's something for all skill levels

with this resource.

If you've made homemade biscuits, scones, rolls, English Muffins, waffles and more, don't skip making your fruit butter. Its just fabulous and only three ingredients.

Celebrate Pigs-in-a-Blanket Day April 24th Everything Spice Pigs in Blanket

National Pretzel Day, April 26, is the perfect day to blend history, science and a favorite food in your classroom. Home Baking Association's free downloadable multi-age lesson Bread with a Twist and the new Dough Shaping 101 DVD are available at www.homebaking.org!

Great resources from the Home Baking Association!

Order by April 30, 2015 and you will also receive a special gift sack with extra resources, recipes and baking gifts from Home Baking Association Members!

Click here to view our available resources

Facebook

Twitter

Website

Email

Pinterest

YouTube

Tumblr

Our mailing address is: HomeBakingAssociation@gmail.com

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: Husker Food Connection Builds Relationships with Consumers
Date: Tuesday, April 28, 2015 10:59:44 AM

From: A-FAN [mailto:willowh@a-fan.org]
Sent: Wednesday, April 22, 2015 11:40 AM
To: Schaneman, Royce
Subject: Husker Food Connection Builds Relationships with Consumers

Phone: (888) 580-AFAN

Web: www.becomeafan.org

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Husker Food Connection Builds Relationships with Consumers

Students at the University of Nebraska - Lincoln had a unique and educational opportunity to learn about modern agriculture on Thursday, April 16 according to the vice president of programming for Collegiate Farm Bureau (CFB) and Alliance for the Future of Agriculture (A-FAN) Intern, Lukas Fricke.

"This year over 60 students who also are producers of agricultural products volunteered to help make this years' Husker Food Connection the biggest success yet. We estimate we had a total reach on campus of over 7,000 between our event and the social media impact," Fricke said.

Husker Food Connection is an agri-educational event where students are exposed to live farm animals, equipment and have the opportunity to interact with many of the agriculture student organizations and state commodity groups. This year, the theme of the event was focused around Food: Fact or Fiction.

"The Nebraska Farm Bureau was a great resource for our student producers to learn proper terminology before the event to help communicate the agriculture message to those on city campus who don't necessarily come from an agriculture background. We had all sorts of questions ranging from 'What is a GMO?' to 'How does the chocolate get into the milk?'" Fricke explained.

The Alliance for the Future of Agriculture in Nebraska (A-FAN) is a non-profit organization formed by leading agricultural membership groups. These groups understand that livestock production is a critical component to Nebraska's future providing vitality and opportunity for rural communities, adding value to Nebraska's agricultural output and energizing the economy of the entire state. To learn more about A-FAN visit the website.

The Collegiate Farm Bureau is a student organization that is dedicated to serving as the 'Voice of Agriculture on Campus' through a wide variety of education, service, and advocacy efforts. For more information about Collegiate Farm Bureau, visit the Facebook page.

PO Box 84606
Lincoln, NE 68501
www.becomeafan.org

University of Nebraska Lincoln

NEBRASKA LEAD PROGRAM
Nebraska Agricultural Leadership Council

May 19, 2015

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

Dear Royce:

I have enclosed the detailed report of the Budget of Expenses: 2014-2015 Funding Year for the Nebraska LEAD Program.

Royce, we sincerely appreciate the support the Nebraska Wheat Board has provided to us this past year. If you ever have any questions or concerns about the Nebraska LEAD Program, I hope you will give me a call at 402-472-6810.

Sincerely,

Terry Hejny

Terry Hejny. Ph.D.
Director

NEBRASKA WHEAT BOARD

NEBRASKA LEAD PROGRAM

BUDGET OF EXPENSES: 2014-2015 FUNDING YEAR

1. 2015 National Study/Travel Seminar

Prorated costs for the 2015 National Study/Travel Seminar to Kansas City, Washington D.C., and Chicago. Total cost of seminar: $38,503 for 10 days: $3,850/day. We are allocating 65% of one day's expenses.

Presentations meeting specific Wheat Board Objectives included:

Briefing/Tour of EPA – Region 7 (Kansas City)
Briefing at National Association of Wheat Growers (Washington, D.C.)
Briefings at CropLife America (Washington, D.C)
Briefings/Tour at CME Group (Chicago)

$2,500.00

BUDGET TOTAL EXPENDITURES **$2,500.00**

Wheat Foods Council

Kernels

Vol. 11

April 2015

Michele Tuttle, MPH, RD – One Grainy Athlete

Grain Chain Supports Grain Recommendations In Dietary Report

Anyway You Slice It, Pie Comes Up Delicious

PLUS:

New Recipes, Studies, and Trending Foods

A Word From Judi Adams

One of the reasons I became a registered dietitian was because it allowed me to combine two of my favorite subjects – science and food. I loved digging into the science behind what we eat and how it impacts our health, and I also loved digging into a tasty plate of pasta that I had prepared.

This issue of Kernels also focuses on the scientific and the culinary side of wheat foods and grains. On the science side, we share the findings of a recent study from Harvard University, which shows that eating whole grains may extend your life. It all adds up to more reasons to eat that bowl of whole grain cereal at breakfast, munch a sandwich on whole grain bread at lunch, or serve your family whole grain pasta at dinner.

We also take a look at the recently-released Dietary Guidelines Advisory Committee (DGAC) report, and share our comments supporting the DGAC's continued call for half of all grain intake to come from whole grains. This recommendation allows Americans to reap the multiple, established health benefits of whole grains, leaving the other half of daily grain intake for enriched grain products, which have their own unique taste and nutritional benefits.

Turning to the culinary side, we highlight exciting new flavor trends for grain foods (think toast and toast flavors). Also trending are pies – move over cupcakes -- and what could be better for spring than tips and recipes featuring pies from sweet to savory and in between, because pies are not just for dessert anymore!

In our recipe spread, we highlight three of our newest recipes, developed specifically for the Wheat Foods Council around the themes of quick, healthy, and delicious.

We've even included a history lesson, taking a look back in time at what was on the "Meso" diet (as in Mesolithic) in what is now Great Britain.

So ponder the science, then get cooking in the kitchen and savor the recipes, because taste and nutrition really do go together.

Judi Adams

Judi Adams, MS RDN,
President, Wheat Foods Council

Click here to join our email list to make sure you get every issue

Welcome!

Eating Whole Grain Foods May Extend Your Life

Findings from a newly-released Harvard Study

Who knew that starting your day with a whole grain bowl of cereal or biting into your turkey and Swiss on whole wheat bread at lunch would help add years to your life? That's what a new Harvard research study has found.

Eating more whole grains is associated with lowering overall mortality up to 9 percent, and it lowered cardiovascular disease (CVD) -related mortality up to 15 percent, according to the long-term study conducted by the Harvard T.H. Chan School of Public Health. The study was published in the Journal of the American Medical Association in January 2015. Just one 28 gram serving of whole grain foods per day were responsible for lowering overall mortality by 5 percent and CVD by 9 percent.

Harvard scientists and researchers monitored consumption of whole grains for a large group of women and men and compared it with mortality data over an approximate 25-year period, adjusting for a variety of factors. While these are self-reported data, which has its limitations, conducting an intervention trial for over 118,000 individuals long term is both financially and logistically impossible. This study shows association and not cause and effect. In addition, according to the authors, the participants were predominantly middle-aged and older healthcare professionals of European ancestry, and it is unknown whether the findings can be generalized to other demographic or ethnic groups.

Assistant professor in the Department of Nutrition and senior author of the study, Qi Sun, stated that these findings "further endorse" current dietary guidelines promoting whole grains as a significant healthy food and that eating whole grain foods helps prevent major chronic diseases.

The Harvard study found that bran, a component of whole grain foods, was linked with up to 6 percent lower overall mortality and up to 20 percent lower CVD-related mortality.

Like all grains, wheat is grown from the seed or "kernel," and each kernel contains three parts - the endosperm, bran and germ.

Whole grain products contain the entire kernel of grain. As the study suggests, the bran provides optimal health benefits like insoluble fiber, B vitamins, trace minerals, and a small amount of protein. In addition, the germ supplies a rich source of trace minerals, unsaturated fats, B vitamins, antioxidants and phytochemicals.

Sources: Harvard T.H. Chan School of Public Health, press release, "More whole grains linked with lower mortality," January 5, 2015; Wheat Foods Council website.

Michele Tuttle, MPH, RD – One Grainy Athlete

Threes seem to be playing an important role in Michele Tuttle's life these days. As the mother of two children, a working registered dietitian, and a competitive, nationally-ranked athlete, she knows the importance of achieving balance between these three areas in her daily life.

She has also chosen to compete in a sport that involves three different events – the triathlon. A life-long athlete, she didn't decide to take on the rigors of being a triathlete until her mid-40s. She has competed at USA Triathlon (USAT) Nationals (Olympic and Sprint distances) and qualified for the 2013 World International Triathlon Union (ITU) Triathlon Championships in London. There, she won the bronze medal in the sprint distance and placed 8th in the Olympic distance. She's been a USAT All-American triathlete since 2012 and is currently certified as a USAT Level I Triathlon Coach and US Masters Swimming Coach (Level 2).

The Wheat Foods Council is pleased to announce its sponsorship of Michele this year, as she sets her sights on her next achievement – competing at the 2015 World ITU in Chicago in September. As part of its sponsorship, Michele will be featured on the WFC website **www.wheatfoods.org**, where both new and old fans will be able to follow her on social media (**@irongirlrd**), read her blog postings, learn about her training regimen including diet and the importance of grains in her training, and watch videos of her in action.

To help you get to know Michele better, Kernels interviewed her recently to find out more about what makes her run…and swim…and bike!

WFC: Why did you start competing as an adult? What motivates you?
I've always enjoyed having a goal or purpose. Although I love training and exercise, somehow it feels better to know that I'm going to "use" it for something. I started swimming competitively at age 13 and continued through college. After graduating from college, I would sign up for an event every now and then, usually a masters swim meet, at least once per year. Having a goal means you get up on those cold dark mornings and train when you'd rather stay in bed.

I think my biggest source of motivation for racing is simply the desire to see where my limits are, physically and mentally. People often say they race and train because they can. The older I get, the more I believe this. I do it because I can. So many people either cannot physically exercise because of health problems, or simply don't feel the payoff of exercise is worth the hassle or discomfort. For me, I've always had to do some form of physical activity to be able to function well in the rest of my life. I wouldn't say I'm "addicted" to exercise but I really don't feel good on the days I don't do some sort of activity. That makes it easy for me: it's sort of like brushing my teeth. I may be tired, but I do it anyway and am always glad I did.

WFC: Why triathlons?
I like a lot of variety in my life. Whether it's food or work or physical activity, I really like doing a lot of different things all the time. Triathlons require training in three different sports. At any one time, you might be feeling great in one sport and miserable in another but something good is usually going on in one of the three. Plus, I love all three sports. And, I love being outside. When you think about it, most kids love to swim, ride their bikes and run around. That's what triathlons are for me: playtime.

WFC: What do you like best – and least – about competing?
The best part about competing is the anticipation leading up to a race. You've put in all kinds of training and preparation but race day is always where it all has to come together. Things will go right and not so right. I love the feeling of knowing you've done everything you can to prepare and now it is sort of out of your hands. Your only job is to do what you can, moment by moment, as you race and deal with the inevitable things that come up that you didn't plan for (like the weather, a flat tire, a cramp or whatever).

I can honestly say that what I like least is that training hard means risking injury. Being injured is the WORST. It's like being sent to your room without dinner (does anyone do this anymore??)…you have to "rest" to get better which means you can't train.

WFC: How do you juggle a family, work and training?
First, I have the world's most supportive husband. He's willing to pick up the slack when I can't do something because of my training or work schedule. It also helps tremendously that I work from home.

It means I can structure my time to fit my training schedule. Since I don't commute, I have more time for training, work and family. Also, I try to do most of my training at times that don't impact our family time. At times, this means either getting to work really early (5:30 am) so I can work out mid-day, or squeezing workouts in between other activities. I won't say it's easy to balance the type of training I do with work and family responsibilities, but it is worth it to me.

WFC: What role do grains play in your diet? Why are they important?
I've always, always, always eaten a diet that features lots of grains. And, I've been a very active person my whole life. I get hungry every 2-3 hours no matter what I eat. For me, foods like cereals, breads, and pasta are staple foods. Of course, I eat other types of grains, too, and I eat whole grains as much as I can. But, I also include a lot of enriched grains because they're easy for me to eat and I like them. For me, grains are especially important because nutritionally, they supply the carbohydrate, iron and B vitamins that I need a lot of because of my training.

WFC: Share with us some sample menus (breakfast, lunch, dinner, snacks).
Typical Breakfast: whole grain cereal with skim milk and fruit, orange juice and coffee with half and half.

Mid-am Snack: handful of almonds and a kefir or yogurt based smoothie.

Lunch: Hearty soup or stew (leftover from dinner) that usually includes some pasta, beans, and lots of vegetables, or an omelet with spinach, onions, mushrooms and cheese with an English muffin.

Mid-pm Snack: Pretzels with peanut butter or corn chips with guacamole or hummus and pita chips. I'm also a big fan of Oreos and milk (shhhh…don't tell anyone).

Dinner: Hearty soup or stew made with beans, pasta, vegetables, and often beef, salad and bread. Another night might be something like chicken marsala with tons of mushrooms, served with sautéed spinach or steamed broccoli and pasta.

WFC: Most of us are not competitive athletes. Are there some key takeaways you can share that we can all do on a day-to-day basis to eat healthier?
I think the important thing is to set an intention toward what you are trying to achieve. If you want to eat healthier, you have to first be specific about what you are going to change, then come up with ways to make it happen. For example, if you are going to switch to a whole grain cereal, you need to make sure that cereal is available and that you like it. Next, it has to be placed where you are going to remember to eat it. And, if you normally skip breakfast because of time, you have to get up in time to eat or else make it possible to bring it with you. In other words, after you set an intention, you have to examine the barriers and work toward removing them.

Any Way You Slice It, Pie Comes Up Delicious

"As American as baseball and apple pie" -- Most Americans would agree that a slice of pie symbolizes one of life's simple pleasures. Pies are enjoyed by many at holiday meals, family gatherings, parties and summer picnics, and they're not just for dessert anymore.

Eighty percent of pie consumers eat pie at other times of day, including breakfast, according to an American Pie Council (APC) consumer survey conducted by the Nielsen Perishables Group in January 2014. The APC survey showed that more than half of respondents eat pie once per month, and the top three favorite pie flavors were apple, pumpkin and chocolate.

Next to Thanksgiving, Christmas is the most popular occasion to serve pies. Nearly 80 percent of people who eat pie have made one from scratch, and over half of cooks were taught by their mothers. Fifty-one percent will buy the pie crust, but make a homemade filling, according to the report.

The definition of pie is not agreed upon by all, but a pie must have a pastry, made with some form of grain, like wheat, combined with a fat and baked in some kind of container. Pies typically have a bottom crust, sometimes a top crust, with sides that encase the fillings.

Pies date back to the Egyptians, about 1300 B.C., where bakers combined fruits, nuts and honey in dough, similar to a galette. Ancient Greeks encased primitive dough comprised of flour and water around meats to hold in juices, but the Romans produced the first recipe, a rye-crusted goat cheese and honey pie.

During European medieval times, pies or "pyes," were primarily filled with savory meat and cheeses and baked in pans called "coffyns." The early colonists brought British recipes for "meat pies" to America and seasoned them with dried fruits and spices. Pumpkin pie was first introduced at the Pilgrim's second, not first, Thanksgiving in 1623, and it was during the American Revolution that the term "crust" was used.

During the 19th century, sweet fruit-filled pies and pastries flourished. Portable or hand-held pies like turnovers, empanadas, and calzones, perfectly encased individual portions in crust and were served by street vendors to working class people as a quick meal.

With today's on-the-go lifestyles, "hand-pies," the homemade or bakery version of the pop-tart, have become popular. Hand-pies come in all shapes - round or square, half-moons or triangles. Pies baked in cupcake molds called "cuppies" by some, are also a great way to make a more traditional pie while sized like a hand-held one. "Cuppies" can be topped with ingredients like fruit compote or crumbled cookies.

Commercial and home bakers are also baking 6-inch mini-pies. The smaller sized pies are more convenient for serving and transport, and they allow for customizing flavors, higher piecrust to filling ratio, and provide the perfect portion.

Pies are growing in popularity and continue to satisfy and delight. The American Pie Council, created to preserve America's pie heritage, has hosted the APC National Pie Championships® since 1995 where amateur, professional and commercial pie bakers compete to be the best in their categories. This year's competition took place in April in Orlando, FL. The group also designated and registered January 23rd as National Pie Day.

Some unusual pie recipes: **Chocolate Avocado Pie (Cakespy.com)**, made with a cookie crumb crust and a whipped cream or meringue topping, or **Old-Fashioned Sawdust Pie**, a recipe from the Loveless Café in Nashville, TN, which gets its name from the mixture of cookie crumbs, pecans and coconut that look like sawdust.

For your next gathering or family meal, try one of the Wheat Foods Council's tasty sweet or savory pie recipes, like **Creamy Almond Peach Pie** or **Broccoli Swiss Quiche with Whole Wheat Pie Crust**.

Sources:

American Pie Council website, **http://www.piecouncil.org/**
Food Timeline: FAQ about Pies & Pastry, **http://www.foodtimeline.org/foodpies.html#portable**
EverythingPIES.com blog, "The History of Pie," posted by Warren Vincenzo Cammpi, **http://www.everythingpies.com/history-of-pie.html**
EverythingPIES.com blog, "Mini-Pies," posted by Pie Guy, **http://www.everythingpies.com/mini-pies-and-recipes.html**
The Washington Post, "Move over cupcakes. Make room for hand pies." by Nevin Martell, 10/14/2011. **http://www.washingtonpost.com/blogs/all-we-can-eat/post/move-over-cupcakes-make-room-for-hand-pies/2011/10/14/gIQAxWa9jL_blog.html**
Craftsy website, "Pie in the Sky: Unusual Pie Recipes for National Pie Day," posted by Jessie Oleson Moore, JAN 23, 2014., **http://www.craftsy.com/blog/2014/01/unusual-pie-recipes/**

Going Grainular:

Great New Ways with Whole Wheat Foods

Wheat Berry and Wild Mushroom Soup with Whole-Wheat Pasta

Ingredient List:
1 cup uncooked wheat berries
2 cups boiling water
½ cup dried porcini or shitake mushrooms (about ¾ ounce)
½ cup finely chopped fresh parsley
3 garlic cloves, minced
1 ½ teaspoons olive oil
1 cup diced onion
4 carrots, sliced
6 cups reduced sodium chicken broth
½ cup white wine (or unsweetened apple juice can be substituted for wine)
1 tablespoon tomato paste
1 ½ cups cooked whole-wheat pasta such as penne
5 ounces fresh spinach
½ teaspoon salt
¼ teaspoon black pepper
6 tablespoons (1 ½ ounces) grated fresh Parmesan cheese

Directions:
Place wheat berries in a medium saucepan; cover with water to 2 inches above wheat berries. Bring to a boil; reduce heat, and cook, uncovered, 1 hour or until tender. Drain.

Combine 2 cups boiling water and mushrooms in a bowl; cover and let stand 30 minutes. Drain mushrooms, reserve soaking liquid. Discard mushroom stems; thinly slice mushroom caps.

Combine parsley and garlic; divide into 2 equal portions.

Heat olive oil in a large Dutch oven over medium-high heat. Add cooked wheat berries, mushrooms, ½ of parsley mixture, onion and carrots; sauté 5 minutes. Stir in reserved mushroom liquid, broth, wine and tomato paste; bring to a boil. Cover, reduce heat, and simmer 30 minutes. Add pasta, spinach, salt and pepper. Cook for 1 minute or until thoroughly heated. Stir in reserved parsley mixture. Spoon soup into bowls and top with cheese.

Servings: 8
Time Saver Tip: Cook extra wheat berries as directed in the recipe or they can be prepared following the brown rice directions in a rice cooker. Freeze for later use.
Calories/Serving: 231
Nutrition: One serving provides approximately: 13 g Protein, 35 g Carbohydrates, 7 g Fiber, 3.5 g Fat (1 g saturated), 4 mg Cholesterol, 50 mcg Folate, 4 mg Iron, 692 mg Sodium

Pasta with Tomato, Kalamata Olives and Arugula

Ingredient List:
2¼ cups chopped plum tomatoes
¼ cup chopped pitted Kalamata olives
1½ tablespoons olive oil
¼ teaspoon salt
¼ teaspoon ground black pepper
2 garlic cloves, minced
6 cups hot cooked whole-wheat fusilli or penne pasta
3 cups baby arugula
2 ounces shaved fresh pecorino Romano cheese

Directions:
Combine first 6 ingredients in a large bowl. Add hot pasta and arugula. Toss gently. Divide pasta mixture among 4 bowls, and sprinkle with cheese.

Servings: 4
***Time Saver Tip:** Cook the whole box of pasta according to package directions. Freeze the leftovers in a freezer bag, reheat for later use.
Calories/Serving: 386
Nutrition: One serving provides approximately: 14 g Protein, 45 g Carbohydrates, 6 g Fiber, 16 g Fat (3.5 g saturated), 15 mg Cholesterol, 25 mcg Folate, 2 mg Iron, 587 mg Sodium

Chicken, Kale, and Black Bean Quesadillas

Ingredient List:
1 poblano pepper
2 cups baby kale
2 tablespoons water
¼ teaspoon salt
1 cup rinsed and drained no-salt added canned black beans
4 (8 inch) whole-wheat flour tortillas
2 cups chopped or shredded cooked chicken (cooked leftovers or rotisserie chicken are options)
1½ cups (6 ounces) shredded Mexican Blend cheese

Directions:
Place poblano pepper on foil under broiler until skin blisters and darkens, about 5 minutes. Seal in foil until cool enough to handle -- about 5 minutes, remove skin, seeds and stem; dice.

Heat water in small skillet. Add kale and salt, stir until kale is wilted, remove from heat. Place ½ cup beans in a bowl; mash. Add remaining ½ cup beans, diced poblanos and kale; mix.

Divide bean mixture among tortillas, top with chicken and cheese. Fold each tortilla in half over filling and lightly coat with cooking spray (on both sides).

Heat skillet to medium heat. Add 2 quesadillas; cook until lightly browned on each side (about 2 minutes per side). Repeat with remaining quesadillas. Cut each quesadilla into 3 pieces.

Servings: 6 (2 pieces per serving)
Calories/Serving: 307
Nutrition: One serving provides approximately: 24 g Protein, 23 g Carbohydrates, 5 g Fiber, 14 g Fat (6 g saturated), 62 mg Cholesterol, 33 mcg Folate, 1.5 mg Iron, 499 mg Sodium

Grain Chain Supports Grain Recommendations In Dietary Report

The Grain Chain coalition, of which the Wheat Foods Council is a member, expressed its support for the Dietary Guidelines Advisory Committee's (DGAC) report recognition of the importance of whole grains in the diet in an oral statement delivered March 24, 2015.

Representing the Grain Chain at the public meeting with officials from the U.S. Department of Health & Human Services and U.S Department of Agriculture was Dr. Glenn Gaesser, PhD, professor at Arizona State University and director of the Healthy Lifestyles Research Center. Dr. Gaesser also serves on the WFC Advisory Board.

In the statement, Dr. Gaesser expressed strong agreement with the DGAC's continued call for half of all grain intake to come from whole grains. "This recommendation would allow Americans to reap the multiple, established health benefits of whole grains, leaving the other half of daily grain intake for enriched grain products, which have their own unique benefits," he said.

He pointed out that, as a category, grain foods contribute vital, and often under-consumed, nutrients to the American diet, including 44% of all fiber. In fact, he noted that a number of scientific

reports have demonstrated the distinctive benefits of cereal fiber compared to fiber from fruits and vegetables.

Referring to the terminology used in the DGAC report, Dr. Gaesser observed that staple grain products like white bread, pasta and tortillas, are placed in the same category as more indulgent refined options such as cake. Dr. Gaesser stressed that "enriched" is a more appropriate term to describe the grain products the average American sees in the grocery aisle.

"These staple foods contain some fiber and are enriched with important nutrients, like thiamin, niacin, riboflavin and iron. They are fortified with folic acid, which is essential for women of childbearing age to help prevent neural tube birth defects.

The rate of neural tube defects in the US has decreased by approximately one-third since the fortification of enriched grains began in 1998," he stated.

Dr. Gaesser further pointed out that the Committee's conclusions that higher consumption of "refined" grains is linked to higher risk of diabetes, cardiovascular disease and obesity are not consistent with a large body of scientific evidence and again, reflect the disconnect in how staple grain products are classified.

To support this statement, Dr. Gaesser referred to many studies not cited by the Committee which show:

- No association between refined/ enriched grain intake and diabetes risk or incident cardiovascular events;
- Little, if any, relationship between body mass index and refined/enriched grain intake; and
- Comparable effects of whole and enriched grains in facilitating weight loss.

Other members of the Grain Chain include the American Bakers Association, American Institute of Baking, Grain Foods Foundation, Grains for Health Foundation, Independent Bakers Association, National Association of Wheat Growers, National Pasta Association, North American Millers' Association, Retail Bakers of America, and USA Rice Federation. The coalition will also be filing formal written comments on the DGAC report with HHS and USDA later this spring.

Mesolithic Wheat Eaters

Scientists have found evidence of wheat in Britain some 8000 years ago – about two thousand years before inhabitants actually grew their own wheat. The research, published in Science magazine, points to a sophisticated trading relationship between Mesolithic (the culture between Paleolithic and Neolithic) peoples previously considered relatively isolated and other, more advanced farming cultures across Europe.

The research is based on discovering the DNA of einkorn wheat, one of the first plants to be domesticated and cultivated, in sediment off the Isle of Wight that was once a peat bog next to a river. Scientists speculate that the wheat was brought there by traders, possibly using land bridges that connected the South East coast of Britain with the European mainland. The wheat may have been ground into flour to supplement the diet of the hunter-gatherers populating Britain at that time.

Co-researcher Professor Vincent Gaffney, of the University of Bradford, stressed the importance of the find in further illuminating a lesser-known period in British and European history. "It now seems likely that the hunter-gather societies of Britain, far from being isolated were part of extensive social networks that traded or exchanged exotic foodstuffs across much of Europe," he said.

WHAT'S TRENDING THIS YEAR:

Toast and Toast Flavors!

(And other hot trends for grain foods)

Every year the food and beverage industry takes the culinary pulse of consumers to find out what they are choosing to eat and drink, and why. The information forms the basis of the "Top Trends" lists announcing which products are "in" and which are "out" across a wide range of categories, including grain foods.

Toast, an interesting favorite this year, was listed as one of the top ten major influencers driving menu trends on The Flavor & The Menu magazine's annual Top 10 Trends for 2015.

However, this is not the traditional slice of whole wheat toast for breakfast, nor a crostini or open-faced sandwich. Toast – varieties of artisanal bread topped with a multitude of ingredients and spreads – is being featured as an individual menu item providing an alternative choice for different meal occasions on menus across the nation.

Evolving beyond the "hipster" cafes where it debuted last year in San Francisco's Bay Area, today's toast offers the simplicity and comfort of our beloved old favorite, in the form of thick slices of freshly-baked breads, perfectly crisped, and topped with a small concoction of ingredients, from savory bacon, cheddar and avocado to fresh fruit paired with honey or cinnamon butters – the sky is the limit.

"Toast" is also showing up as a flavor this year, reminiscent of what we make for breakfast, buttered to serve with eggs or sprinkled with cinnamon and sugar. The flavor was showcased during the January Winter Fancy Food Show in San Francisco, where buyers from supermarkets, delis and specialty markets sample new key food trends.

Some of the toast-flavored offerings included The Republic of Tea's "Cinnamon Toast HiCaf Tea" and B.T. McElrath Chocolatier's "Buttered Toast Chocolate Bar" with toasted breadcrumbs and the company's blend of cacao milk chocolate. San Diego-based Chuao Chocolatier offered their "Salted Chocolate Crunch," combining toasted crumbs with sea salt and dark chocolate.

Burnt toast is even being used as a spice! According to Saveur magazine's 2015 Top 100 list of the most unusual trends, Chefs Nick Balla and Cortney Burns of San Francisco's Bar Tartine, are using burnt bread as a spice. To prepare, grill slices of crusty, country-style bread until it is black and grind into powder. The powder – think charcoal dust - has a nutty, smoky flavor that compliments mixes, sauces, chicken and roasted vegetables, or even ice cream.

Other Trends for Grain Foods

Each year, the National Restaurant Association surveys chefs from the American Culinary Federation about food, cuisine, and theme trends.

Breakfast or brunch trends for 2015 include egg white sandwiches and breakfast burritos. Italian food and French toast were rated perennial favorites, while Americans continue their love affair with doughnuts, which climbed in popularity by 12 percent. Whole grain foods in kids meals ranked 14th on the Top 20 Food Trends for 2015 list, and for desserts, bite-size minis, savory desserts, and hybrid innovations, like croissant-doughnuts (cronuts) or townies (tartlet brownies), were the high on the list.

Last year, Parade Magazine partnered with the NPD Group, a market research company, to examine the eating habits and attitudes of 1,000 American men and women from every region of the country, then compared the answers with historical data from NPD. The resulting article, "What America Eats," reported some interesting trends for grain foods. For instance, people are sourcing more sandwiches from the grocery store freezer case, and 47 percent of breakfast meals ordered are sandwiches or wraps. Of the foods parents pack for kids' lunches, sandwiches remain king at 66 percent. Pizza topped the list as the number one fast food item ordered for dinner. The survey also found that healthier snacks like protein bars are gaining in popularity, up 14 percent, and savory snacks are more popular than sweet.

Sources:

Flavor & The Menu, press release, PRNewswire, 2015 Menu Trends, Jan. 15, 2015. **http://www.prnewswire.com/news-releases/brunch-ranch-dressing-and-italian-fast-casual-top-list-of-2015-menu-trends-300020998.html**

"Love/hate food trends (and where to find them)," by Emily Saladino, Special for USA TODAY, Oct. 7, 2014. **http://experience.usatoday.com/food-and-wine/story/news-festivals-events/2014/10/06/love-hate-food-trends/16824379/**

"A Toast Story," by John Gravois, Pacific Standard, Jan. 13, 2014., **http://www.psmag.com/health-and-behavior/toast-story-latest-artisanal-food-craze-72676**

Chuao Chocolatier website: **http://chuaochocolatier.com/chocolate-bars/bars/salted-chocolate-crunch.html**

B.T. McElrath Chocolatier website: **https://www.btmcelrath.com/product/buttered-toast-bar/**

"Toast is a flavor: Incredible food trends in 2015," by Elizabeth Weise, Jan. 13, 2015 USA Today/CNBC.com, **http://www.cnbc.com/id/102333254**

NPD Group partnered with Parade Magazine, survey/study about eating patterns; reported in the Parade Magazine article, "What America Eats," September 5, 2014., **http://communitytable.com/334779/parade/what-america-eats-our-exclusive-survey-on-the-nations-changing-tastes/**

The Saveur Top 100, "Burn Your Toast (on Purpose)," Jan. 21, 2015, **http://www.saveur.com/article/techniques/burn-your-toast-on-purpose**

The National Restaurant Association surveyed professional chefs, members of the American Culinary Federation, on which food, cuisines, beverages and culinary themes will be hot trends on restaurant menus in 2015., **http://www.restaurant.org/Downloads/PDFs/News-Research/WhatsHot2015-Results.pdf**

MIDLAND UNIVERSITY

MASTER OF BUSINESS ADMINISTRATION

February, 2014

To whom it may concern:

The Midland University MBA program is designed to produce graduates that demonstrate highly developed analytic and communication skills, a strong ethical foundation, and mastery of the tools and concepts it takes to be a respected leader in business.

An important part of developing this well-rounded business competency is understanding how global economic factors can impact business at home and around the world. Exposure to business challenges in a variety of settings and witnessing different approaches in addressing them also helps cultivate nimble problem solving skills.

For this reason, the Midland MBA requires that each student complete a globally focused business consulting project in the final term of the program. This capstone project offers students the opportunity to bring the many analytic skills they have developed during the course of the program to bear on a real-world project to be defined in collaboration with the host company and a faculty advisor. From this work, they will develop a consulting report and present this analysis in a corporate setting.

The end result of this experience for the student will be an expanded skill set as a problem solver as they practice quickly analyzing a situation, helping to define the scope of a project, brining relevant research and analysis to bear on a situation, and then presenting findings to an informed audience, while making a real contribution to an organization involved in work relevant to their careers.

The result for the host company will be progress toward building an initiative or solving a problem that has not yet reached prioritization with extant company resources. In addition to "free labor," the company will benefit from a fresh perspective and professionally-guided quantitative analysis.

Ideally, this consulting project would take place abroad, where a student will have the opportunity not only to research and report on a relevant topic to the host business, but also would have the opportunity to more deeply understand the cultural context for that business. However, we recognize that it is not possible for all students to spend a week or more away from work and families, and therefore we allow an exemption for students to work on site with a local company focusing on an aspect of their global operations.

If additional information about this project, or any aspect of the Midland MBA program, would be helpful to you, please do not hesitate to contact me at Raymond@MBA.MidlandU.edu or 402-370-6622.

Sincerely,

Raymond Sass

Raymond Sass
Director of the MBA
Midland University

WFC Member Update - February 2015

WheatFoods.org

51 D Red Fox Lane, Ridgway, CO 81432

In this Issue: Generating the Buzz, Two New "Wheat People," Next Board Meeting Is Being Held in Durango, CO, February Re-cap, Access to Member's Only Section, and More!

Generating the Buzz

February marked the long-awaited publication of the 2015 Dietary Guidelines Advisory Committee's (DGAC) final report. The report provides a baseline to the Departments of Health & Human Services and USDA for the writing of the 2015 Dietary Guidelines for Americans. The final 2015 guidelines are anticipated this fall.

While the report was universally positive regarding consumption of whole grains, so-called "refined" grains were consistently linked with unhealthy eating habits and negative health outcomes. Nonetheless, the DGAC recommended continuation of the current dietary guidance of six servings of grains daily, with at least half from whole grains, due to recognition that a combination of "refined" and whole grains result in higher consumption among Americans of key nutrients, such as iron, magnesium and folic acid, which they might otherwise lack.

We worked closely with other organizations in the Grain Chain to develop our strategy prior to the report's release and are now moving forward as a coalition in developing written comments, as well as an oral statement to be delivered at a public meeting in Washington, DC, in March 2015.

February also saw release of the third edition of our "News You Can Use" e-letter for supermarket dietitians. This issue focused on National Nutrition Month in March, with tips on ways to eat fewer calories and more nutrients, including wheat foods, of course; suggestions on how to work more physical activity into our daily lives; and the WFC's popular Energy Bar recipe. The e-letter also highlighted results of a recent study published in the *Journal of the American Medical Association* (JAMA), revealing no clear health benefit to a low-glycemic index (GI) diet. This is important for wheat foods since many carbohydrates like grains are high GI foods when eaten in the absence of other foods.

The WFC website was a major focus in February as well with work underway on a new design for the home page. WFC board members provided input on the design at the January 2015 board meeting. We also surveyed a select group of our influencer audiences to get their input on the most pleasing – and user-friendly design from among several choices. Stay tuned for the unveiling – with redesign of the interior pages to follow later in the program year.

Social Media Update

Facebook.com/wheatfoods
28 Posts, 280 Likes, 43 Shares, Reached 13,773 people, Monthly growth from 1083-1094

Twitter.com/wheatfoods
17 posts, 3 Retweets, 4 Favorites, Monthly growth from 1630-1653

Two of our members have new people who will be representing their organizations at the WFC board meetings. We're pleased to welcome Stacie and Kim.

Stacie Seger

Communication Manager

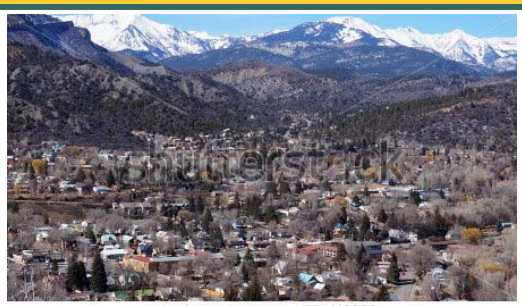
Ohio Small Grains Marketing Program

Kim Wagner,
Communications & Marketing Director
CO Wheat Commission

WFC Board Meeting Scheduled

Our next board meeting will be **June 16-17, 2015 in Durango, CO.**

We hope you will plan to attend!



Durango, CO - Population about 17,000

June 16 – Starting at 9 am: media training, executive officer's meeting, possible speaker (TBD) or group activity, and group dinner.

June 17 – Board meeting, 8:30 am – 3:30 pm followed by group dinner.

For planning purposes: The nearest airport is Durango-La Plata County Airport (DRO) located 12 miles southeast of Durango, CO. Homewood Suites has a complimentary shuttle to transport attendees.

The nearest **major** airport is Albuquerque International Sunport Airport (ABQ) – about a 3.5 hour drive to Durango.

Denver International Airport (DIA) is about a 6 hour, beautiful drive to Durango**.**

We will be staying at the Homewood Suites just outside Durango and the meetings will be held there as well. We'll be sending out hotel reservation information in March. Our block will include rooms for Monday, Tuesday and Wednesday nights (June 15, 16 and 17) with the option of the same rate 3 days before and 3 days after.

For anyone wanting to come north to our WFC office (90 miles from Durango), we'll host you for drinks and appetizers before or after the meeting dates. This is a beautiful vacation area and we hope you have a chance to experience it. Check out this hyperlink for things to see and do in the area:

http://www.durango.org/discover-durango/

Women Managing the Farm

Judi Adams, MS, RDN, President, WFC was the opening session speaker for the **Women Managing the Farm** conference held Feb. 5-6 in Manhattan, KS. "Celebrating Women: Healthy Heroes in Agriculture" was the title of Adams' presentation.

One conference attendee's Tweet: "I completely enjoyed Judi Adams presentation at the Women Managing the Farm Conference - Kansas #wmfheroes #wheat #gluten #farming Thanks for speaking Judi!"

A special thanks to Kansas Wheat Commission for sponsoring Judi as the opening session speaker.

February Re-Cap:

- Job Announcement for WFC President's position was released. As many of you know, our president Judi Adams, MS, RDN, is planning to retire June 30, 2015.
- Adams to attend/present at BEMA meeting in Chicago Feb. 28 and attend the Society of Bakery Women reception Feb. 28, also in Chicago.
- Veum to exhibit at the Commodity Classic "wheat booth" Feb. 26-28, in Phoenix, AZ. NAWG, U.S. Wheat Associates and WFC have a joint booth where we will be asking trivia questions about wheat for a chance to win a give away item. If you are at C.C. please stop by **Booth #413** for your chance to enter to win our grand prize drawing for a Go-Pro Camera.
- Food photography planning is in the final stages and set for a March 3-6 shoot in Salt Lake City, UT. Adams, Dave Mangan, Kelsey Hanson (the photographer we used for our last shoot) and a food stylist will be involved in the shoot.
- Pat Montgomery, MS, RD finished developing and testing 14 new recipes that will be included in the upcoming photo shoot. Special thanks to MGPUB for funding this project. Pat did an excellent job and we know you will be pleased with the new recipes that will be available for your use in the coming months.

Oklahoma State Receives Wheat Variety Royalties That Top a Half Million Dollars for 2014 Sales

Oklahoma Genetics Inc. Executive Director Mark Hodges credited **OSU's wheat breeding specialist Dr. Brett Carver** for developing varieties adaptable to the Southern Great Plains.

Congratulations to our WFC Advisory Board member Dr. Brett Carver for this accomplishment!

To access the members only section of our homepage:

At the bottom of the page, just to the left of the E-Magazine sign up, you will see "Members Login."

User name: **WFNmember** (case specific)

Password: **#wfnmember2013** (case specific)

WFC Member Update - March 2015

WheatFoods.org

51 D Red Fox Lane, Ridgway, CO 81432

In this Issue: Generating the Buzz, Sponsorship of Michele Tuttle as Spokesperson, WFC Board Meeting Hotel Reservation Information, March Re-Cap and More!

Generating the Buzz

Lights, camera, action – in early March the Wheat Foods Council was on set in Salt Lake City, UT, for new photography for the recipe section of the wheatfoods.org website. Wheat Foods Council President Judi Adams, along with k+m principals Jula Kinnaird and Dave Mangan, oversaw the shoot, utilizing the talents of photographer Kelsey Hansen and food stylist Suzy Eaton. Over the course of 2 ½ days, 20 recipes were shot – 14 new and 6 updating existing ones. Keep an eye on the website for a new section "Latest Recipes," under the Recipe tab, featuring the shots and accompanying recipes. Recipes were developed by Pat Montgomery, MS, RD, who previously worked for Campbell Soup.

Shown here are a few of the new shots. Delicious, nutritious, and beautiful!

Also underway are plans to promote the Wheat Foods Council's sponsorship of triathlete Michele Tuttle, MPH, RD, who will be competing in the International Triathlon Union (ITU) Grand Final 2015 in Chicago. Michele was a bronze medal winner at the 2014 Worlds in London and is ranked #11 in the US in her age group. As a mom, athlete and RD very knowledgeable about carbohydrates and wheat, Michele makes a perfect spokesperson for WFC.

Promotion strategies include adding a page to the existing WFC website about Michele and her quest where we will highlight her diet (lots of wheat foods and carbs) and training regimen. The page will also feature Michele's social media outreach including blogs and tweets. In addition, Michele will be authoring articles on such topics as why she doesn't follow a Paleo diet, why she isn't a vegetarian or vegan, and why she doesn't avoid white flour. Further marketing plans include featuring Michele as part of the WFC's participation in the May 2015 Sports Cardiovascular and Wellness Nutrition meeting (SCAN) as well as in the WFC quarterly e-magazine *Kernels*.

Our next board meeting is June 16-17, 2015 at the Homewood Suites, in Durango, CO.
Our hotel reservation block is NOW OPEN!
Please reserve your room no later than May 12.

Book online at www.homewoodsuites.com, select "Durango Homewood Suites", then put in your check in and check out date, then enter **group code WFC.** Rate should come up as $165.00 plus tax. Or, book directly with the hotel at 970-259-2996, or through the Hilton toll free line at 800-CALL HOME. IMPORTANT: Use our name and group code, Wheat foods Council, WFC when making your reservation.

Gayle will be sending a "Nitty Gritty Details" form in May to assist in meeting planning.

Reminder: Please promote WFC Recipes

It's a great way to remind people how delicious, easy to prepare, affordable and versatile wheat foods can be. Nutritious AND delicious is a great combination!

Recipe of the Month - We'd like for you to promote this recipe *Artichoke Wheat Berry Salad* or the ***Mexican Bulgur*** to support "Make at least half your grains whole" during the month of April. The Whole Grains Council asked the WFC to participate in their "Try a Whole Grain Today" campaign on April 1. Both of these recipes use 100% whole wheat.

Commodity Classic "Wheat Booth" - Veum exhibited along with U.S. Wheat Associates and NAWG staff members Feb. 25 - 26 in Phoenix, AZ.

WFC distributed both of our Family Feature articles, "Truth About Gluten" and "Resolve to Get Healthier." The Trivia Wheel, which has questions about wheat from nutrition to Ag policy, was used to engage booth visitors. Giveaways included rubber jar grippers and window decals with the "I ♥ Wheat" logo.

These giveaways were not nearly as popular as last year's "I ♥ Gluten" mugs and tumblers.

The mugs and tumblers cost around $4 per/mug and were in big demand.

IF you have a good idea for giveaways for the WFC to have on-hand for members use and for exhibits please let us know. Cost **is** a major factor.

March Activity Re-Cap

- Grain Chain reviewed Dietary Guidelines Report (all 517 pages worth!). Conference calls were held to discuss the topics for oral comments which were presented at the DGAC meeting March 24th in D.C. Dr. Glenn Gaesser did an excellent job on behalf of the Grain Chain. Our message (in a nutshell) was to support the continuation of making at least 1/2 your grains whole..." and to reiterate that enriched grains have an important role in the diet which is supported by numerous peer-reviewed studies.
- Adams presented at BEMA February 28 in Chicago, IL. requesting special project funding.
- Veum, filling in for Adams, shared the podium with Christine Cochran, Executive Director of GFF, to present at the NAMA meeting in Naples, FL March 16.
- Food photography took place in Salt Lake City, UT March 4-6. Adams, Dave Mangan and Jula Kinnaird were there to alternately supervise the shoot. Kelsey Hansen, professional photographer and professional food stylist, Suzy Eaton worked well as a team. New, as well as modified recipes will be added to the WFC website. PLEASE use any and all recipes which have new, high resolution photos.
- Adams will attend ABA and IBA annual meetings in Phoenix, AZ, March 29-April 1. Adams will present at IBA's annual meeting.
- A "Call to Action" was sent to WFC and NAWG members asking the various wheat organizations to send letters to their local PBS affiliate stations that have been broadcasting **"paid"** programming by Dr. William Davis (Wheat Belly) or Dr. David Perlmutter (Grain Brain). Their misinformation continues to permeate the airwaves and print media, and not just in the U.S. We are discussing other ways we may be able to address this type of programming on PBS affiliated stations that make the programs appear "legitimate" and "educational." Please let us know what type, if any, responses you receive from your letter writing campaigns.

To access the members only section from our homepage, go to the far bottom of the page and just to the left of the E-Magazine sign-up you will see "Members Login."

User name: **WFNmember** (case specific)
Password: **#wfnmember2013** (case specific)

From:	Schaneman, Royce
To:	Wheat-Board, Intern
Subject:	FW: Message from new University of Nebraska President Hank Bounds
Date:	Monday, April 27, 2015 4:15:26 PM

From: Office of the President [mailto:president@nebraska.edu]
Sent: Monday, April 13, 2015 1:49 PM
To: Schaneman, Royce
Subject: Message from new University of Nebraska President Hank Bounds

Dear ag leaders:

Today I begin my service as the seventh president of the University of Nebraska. I am humbled and honored to have the opportunity to lead one of America's great universities and I look forward to working with stakeholders across Nebraska to build an even stronger institution for the future. I am convinced that the university can become a true giant in higher education, doing more to impact the lives of students and people in Nebraska and around the world. I invite you to help me define what it means to be that giant, and how we can work together to achieve it.

In particular, the University of Nebraska is in an extraordinary position to lead the way in sustainably feeding the world. As I have prepared for my new role, I've quickly gained an appreciation for the important work happening at the Institute of Agriculture and Natural Resources and for the close working relationship that exists between the university and farmers, ranchers and producers across the state. Agriculture has always been a fundamental priority for the University of Nebraska, and today more than ever we have a responsibility to play a leading role in achieving global food, water and natural resources security. Indeed, Nebraska – and our world – need the university to be a giant in meeting the needs of 21st-century agriculture.

I am spending my first week as president touring the state, getting to know many of the rural people and communities that make Nebraska great. Among other stops, I will visit the university's agricultural campus in Curtis, research and extension facilities, rural high schools and community colleges, and many others – some 20 communities in all. In some ways, my Nebraska tour brings me full circle to my upbringing in rural Mississippi, where my family raised pigs and cows on our farm. I have firsthand experience with the vital work you do every day and the impact it has on the quality of life for people in the state and around the world. I know, too, that Nebraska's agricultural leaders have been great champions for the university. I am grateful for your advocacy and I look forward to continuing our partnership.

Thank you again for your support and all you do for Nebraska.

Sincerely,

Hank Bounds
President, University of Nebraska

Mr. Royce Schaneman
Nebraska Wheat Board
PO Box 94912
INTEROFFICE 00 68509

Dear Mr.Schaneman:

The Nebraska Agricultural Youth Council (NAYC) consists of 21 college-aged men and women selected by the Nebraska Department of Agriculture (NDA). The mission of the NAYC is to promote agriculture to the youth of Nebraska. To accomplish this goal, the Council conducts educational projects throughout the year, including the Nebraska Agricultural Youth Institute (NAYI), which is held annually in July.

NAYI is a five-day summer conference for high school juniors and seniors from across Nebraska. Through the generosity of sponsors, the entire experience is free of charge for the youth that attend. The purpose of the Institute is to encourage youth to stay involved in the various facets of agriculture by informing them about the career opportunities available in the agriculture sector, and to develop leadership potential in the youth in attendance. Furthermore, NAYI serves as a means for young people with a common agricultural background to connect and network together to build lifelong relationships. It is our firm belief that the future of Nebraska's agricultural industry is being shaped at this very conference.

We ask you to consider becoming a sponsor of the 2015 NAYI. Past sponsors will tell you that their support for NAYI is a way for them to invest in the future of agriculture. The 2014 NAYI saw the largest amount of delegates in attendance in the 43-year history of the program. We feel this is an encouraging sign of what's to come in the agricultural industry, and we anticipate setting a new record number of delegates to attend our 44th annual NAYI in 2015.

By supporting this program, the Nebraska Wheat Board also has an opportunity to reach out to future customers, as well as potential employees who are directly involved in agriculture. Enclosed with this letter, you will find more detailed information about sponsorship levels and benefits.

As you consider this request, please allow me to provide additional information or answer any questions you may have. You can reach me at (402) 471-2341 or via e-mail at greg.ibach@nebraska.gov. You can also reach Johnny Ference or Trent Mastny, the young individuals responsible for coordinating the 2015 NAYI at (402) 471-6864 or via e-mail at agr.nayi@nebraska.gov. I would also like to encourage you to visit www.nda.nebraska.gov/NAYIsponsors to learn more about NAYI.

If you choose to sponsor, you can make checks payable to the Nebraska Department of Agriculture and return to:

Nebraska Department of Agriculture
Attention: Johnny Ference or Trent Mastny
P.O. Box 94668
Lincoln, NE 68509-4947

Thank you for your consideration in helping the Nebraska Agricultural Youth Council and the Nebraska Department of Agriculture to develop future leaders in the agricultural industry.

Sincerely,

DEPARTMENT OF AGRICULTURE
Greg Ibach
Director

SPONSOR INCENTIVES

SOWER
$7,500 & Above

- Promotional piece distributed to all delegates
- Logo placement throughout NAYI materials
- Industry representative speaker (30 minutes)
- Booth at the NAYI Career Fair
- 4 tickets to, and recognition at, the NAYI State Dinner
- Additional recognition at NAYI as the opportunity arises

COTTONWOOD
$5,000 - $7,499

- Logo placement throughout NAYI materials
- Industry representative speaker (15 minutes)
- Booth at NAYI Career Fair
- 2 tickets to and recognition at the NAYI State Dinner

GOLDENROD
$3,000 - $4,999

- Logo placement throughout NAYI materials
- Booth at NAYI Career Fair

MEADOWLARK
$1000 - $2,999

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NAYI 2014

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: Nebraska Wheat Field Days
Date: Monday, April 27, 2015 3:50:57 PM

From: Teshome Regassa [mailto:tregassa2@unl.edu]
Sent: Wednesday, April 08, 2015 2:53 PM
To: Wheat-List@Listserv.unl.edu; Schaneman, Royce; Chris Cullan (candjcullan@bbc.net)
Subject: RE: Nebraska Wheat Field Days

Folks sorry for cluttering your in box.

There is another field day on June 23 at the Wheat Lab near Grant. To give chance for the folks driving to Kimball, the field day at Kimball is pushed to 6:00 PM. Please mark your calendar accordingly.

Thanks

Teshome

From: Teshome Regassa
Sent: Wednesday, April 08, 2015 11:16 AM
To: 'Wheat-List@Listserv.unl.edu'; Royce Schaneman (royce.schaneman@nebraska.gov); Chris Cullan (candjcullan@bbc.net)
Subject: Nebraska Wheat Field Days

The dates for Nebraska Wheat Field Days are shown in the following table. Please refer to the field map attached for direction to individual plots. Information for sites will be available soon form the county extension offices hosting each site. Please contact Dr. Dipak Santra for further information regarding the sites in the Panhandle.

Date and PM time	Site
June 18 @ 6:30	Saline County, North of Wilber
June 23 @ 5:00	Kimball County
June 24 Morning	High Plain Agri. Lab near Sidney
June 24 @ 3:00	Box Butte County Irr.
June 24 @ 5:00	Box Butte County RF

Best

Teshome

Teshome H. Regassa, Ph.D.
Research Assistant Professor &

Daugherty Water for Food Institute Faculty Fellow
University of Nebraska-Lincoln
Dept. of Agronomy and Horticulture
175 Keim Hall, Lincoln,NE 68583-0915
Phone (402) 472 1489
email tregassa2@unl.edu
UNL Variety Testing Home

"When you cease to dream, you cease to live." M.S. Forbes

STATE OF NEBRASKA

Pete Ricketts
Governor

OFFICE OF THE GOVERNOR
P.O. Box 94848 • Lincoln, Nebraska 68509-4848
Phone: (402) 471-2244 • pete.ricketts@nebraska.gov

March 5, 2015

The Honorable Mitch McConnell
Senate Majority Leader
317 Russell Senate Office Building
Washington, DC 20510-1702

The Honorable John Boehner
Speaker of the House
H-232 The Capitol
Washington, DC 20515

Dear Senator McConnell and Speaker Boehner:

We are writing to request you use your leadership positions to move forward expeditiously legislation that will grant Trade Promotion Authority (TPA) to the President.

International trade is a critical piece of Nebraska's economy, impacting two of our largest sectors, agriculture and manufacturing. We exported $7.3 billion in products in 2013, much of that attributed to our agriculture base and the processing sector tied to it. While we have seen growth in the value of exports during the time period since TPA expired in 2007, we recognize that the authority provided by this legislation allows for a better negotiating position.

We are at an important point in our history in regard to opening the doors to foreign markets. As you know, the Trans Pacific Partnership (TPP), as well as the Trans-Atlantic Trade and Investment Partnership (T-TIP), have the opportunity to provide increased market access that will drive new growth. TPA also could prove to be a helpful tool in finalizing bilateral negotiations between the United States and other nations, representing new markets, improved access, and/or lower tariffs.

TPA has been granted to every President since 1974 to provide him with the needed negotiating power to secure trade agreements with our foreign partners. We believe the timely approval of this important authority for the President is critical to helping us continue to grow Nebraska's economy. We appreciate your consideration.

Sincerely,

Pete Ricketts
Governor

Greg Ibach
Director of Agriculture

Name: Dave Fisher
Organization: NE Farm Bureau

Name:
Organization: NE Farmers Union

Name: Kenneth F Bernell
Organization: Nebraska Soybean Assn

Name: Chris Abbott
Organization: ICON

Name: Ronald E Pauli
Organization: producer

Name: Tom A. Ramm
Organization: ICON

Name: Tim Chancellor
Organization: Nebraska Pork Producers

Name:
Organization: NE Grape & Winery Board

Name: Paul Kenney
Organization: Ne Ethanol Board

Name: Stefan Kegley
Organization: Nebr. Winery & Grape Growers Assoc (NWGGA)

Name: Terry Vest
Organization: NSBA

Name: Lori Paulsen
Organization: NWGGA

Name:
Organization: NE Grain & Feed

Name:
Organization: Nebr State Dairy Assn

Name: Andrew J Daniels
Organization: Nebr Fruit & Vegetable Ass

Name: James Enkler
Organization: Dairy

Name: Leon Keener
Organization: Nebr. Dry Bean Growers

Name: Lowell Mueller
Organization: Midwest Dairy Ass

Name:
Organization: NE Dry Bean Commission

Name: William L. Thiele
Organization: Nebraska State Dairy Association

Name: Brent Robertson Name: David McCracken

Organization: Nebraska Wheat Board Organization: Nebraska CATTLEMEN

Name: [signature] Name: [signature]

Organization: Nebraska Wheat Growers Organization: Nebraska Potato Committee

Name: Julie M. Kelly Name: _____

Organization: Nebraska Poultry Industries Organization: _____

Name: Tim Eschen Name: _____

Organization: Nebraska Corn Board Organization: _____

Name: Tom Nathan Name: _____

Organization: Nebraska Corn Growers Organization: _____

copies: Honorable U.S. Senator Deb Fischer
Honorable U.S. Senator Ben Sasse
Honorable Congressman Jeff Fortenberry
Honorable Congressman Adrian Smith
Honorable Congressman Brad Ashford

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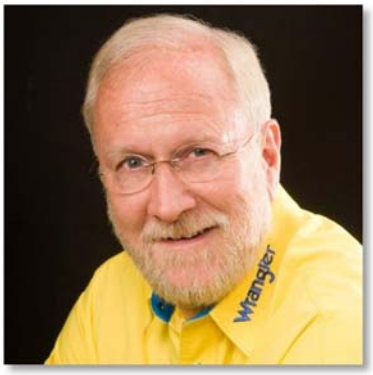

TRANSPORTATION UPDATE

From: Terry Whiteside

Date: March 11, 2015

SUMMARY OF BNSF FREIGHT RATE INCREASES THAT ARE SCHEDULED FOR MAY 1, 2015

While the BNSF has not published all of the anticipated increases, a number of them have been noticed in the pending BNSF files. Caution should be taken in viewing these numbers, as they are subject change before they are put into effect, however it is evident that the railroad is looking at major increases into the PNW and Gulf Coast markets.

In the coming days, we will continue to publish more charts on proposed increases by individual states. On March 9, 2015 we published the rate and proposed increases from MT to the PNW and from CO to the Gulf. If you need another copy of that report, just drop us a note.

Today, we will examine SD to the Gulf Coast and NE to the Gulf Coast

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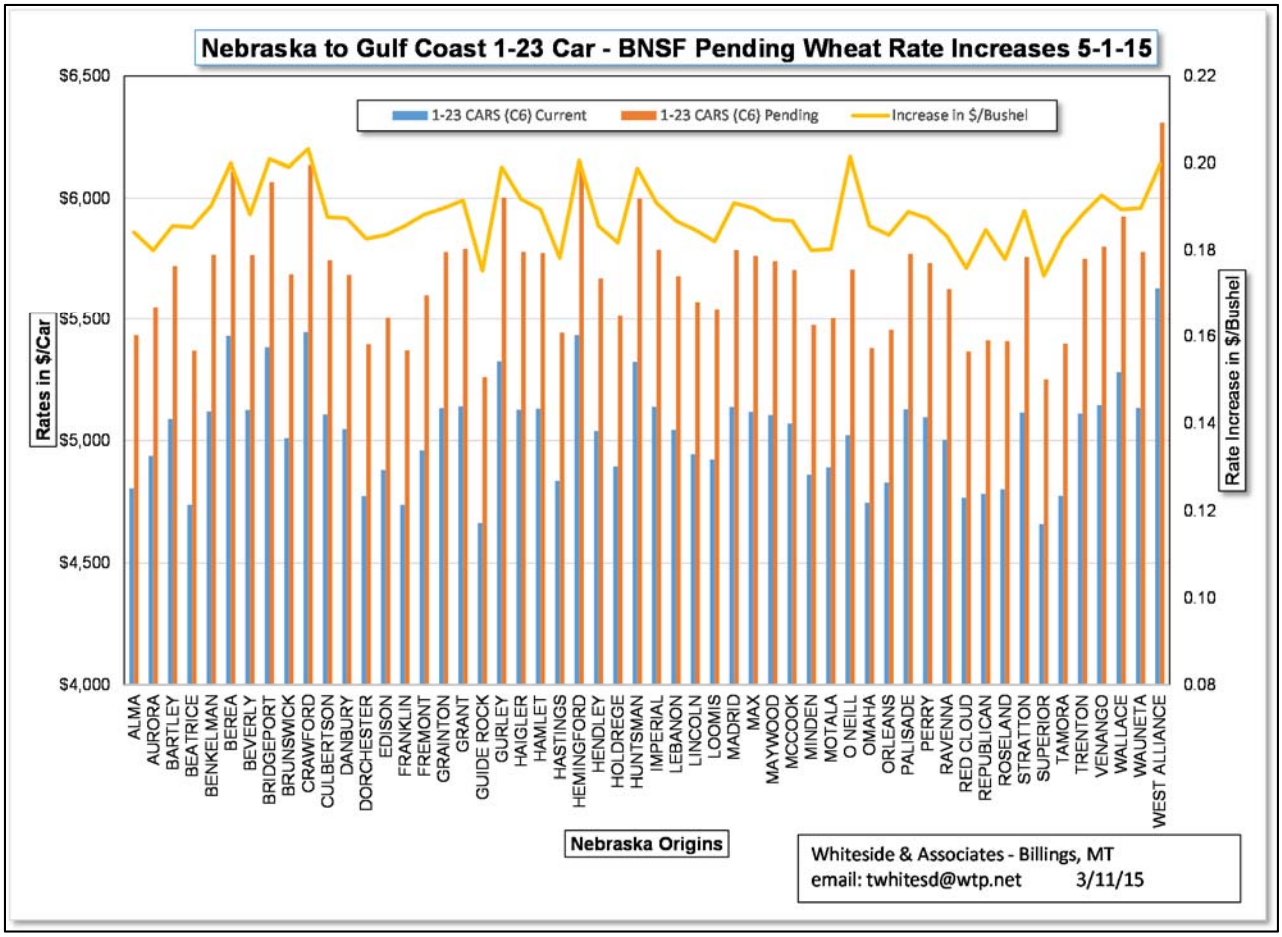
Billings, MT 59101, Phone: 406-245-5132 email: twhitesd@wtp.net



The Nebraska movements to the Gulf Coast are scheduled for rate increase of generally 18¢ - 20¢ per bushel effective 5-1-15. The Nebraska rates have been published in the pending file and they are outlined above.

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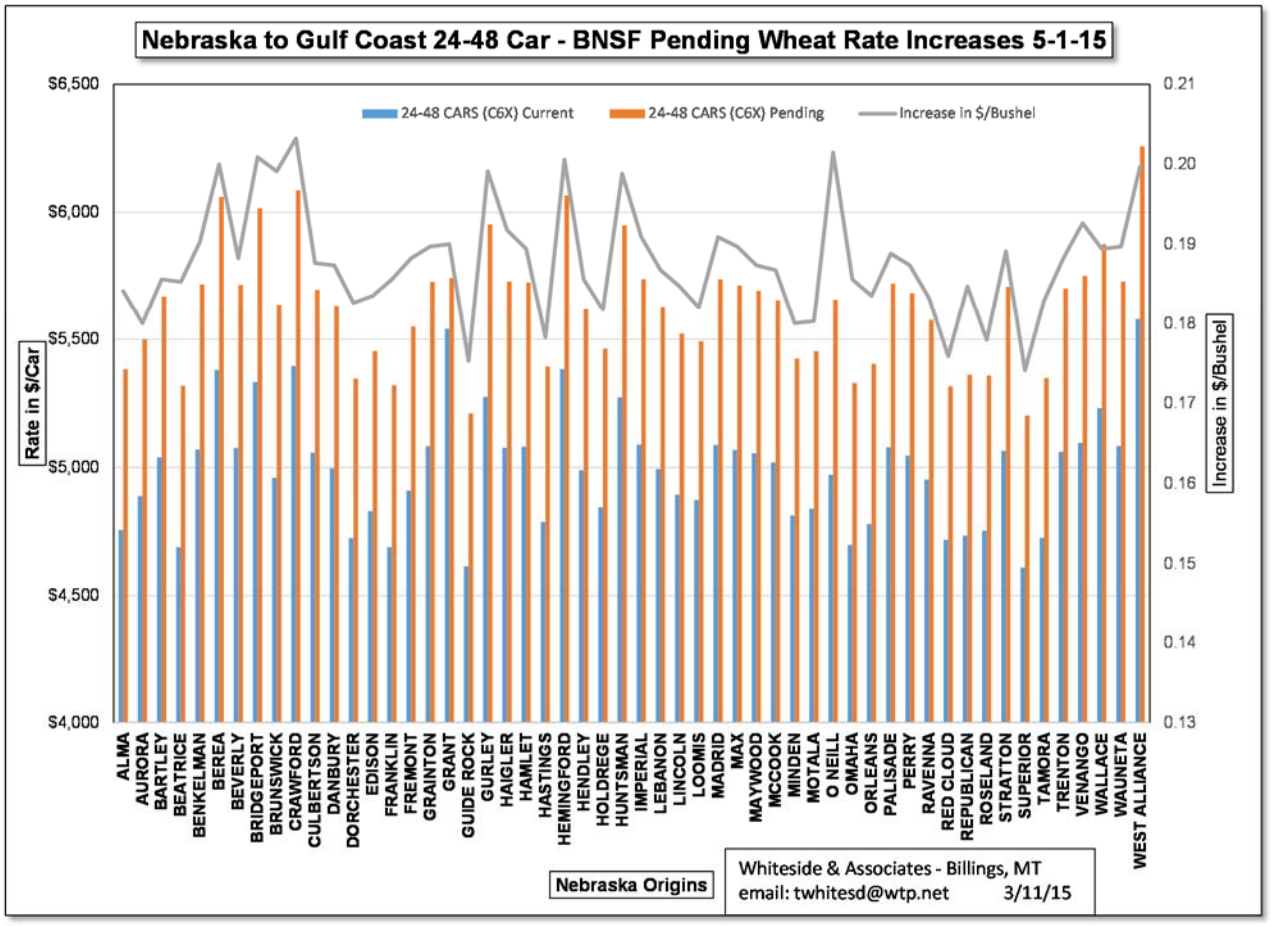
Billings, MT 59101, Phone: 406-245-5132 email: twhitesd@wtp.net



The NE to Gulf Coast increases have been published and they are reflected above for the 24-48 car levels.

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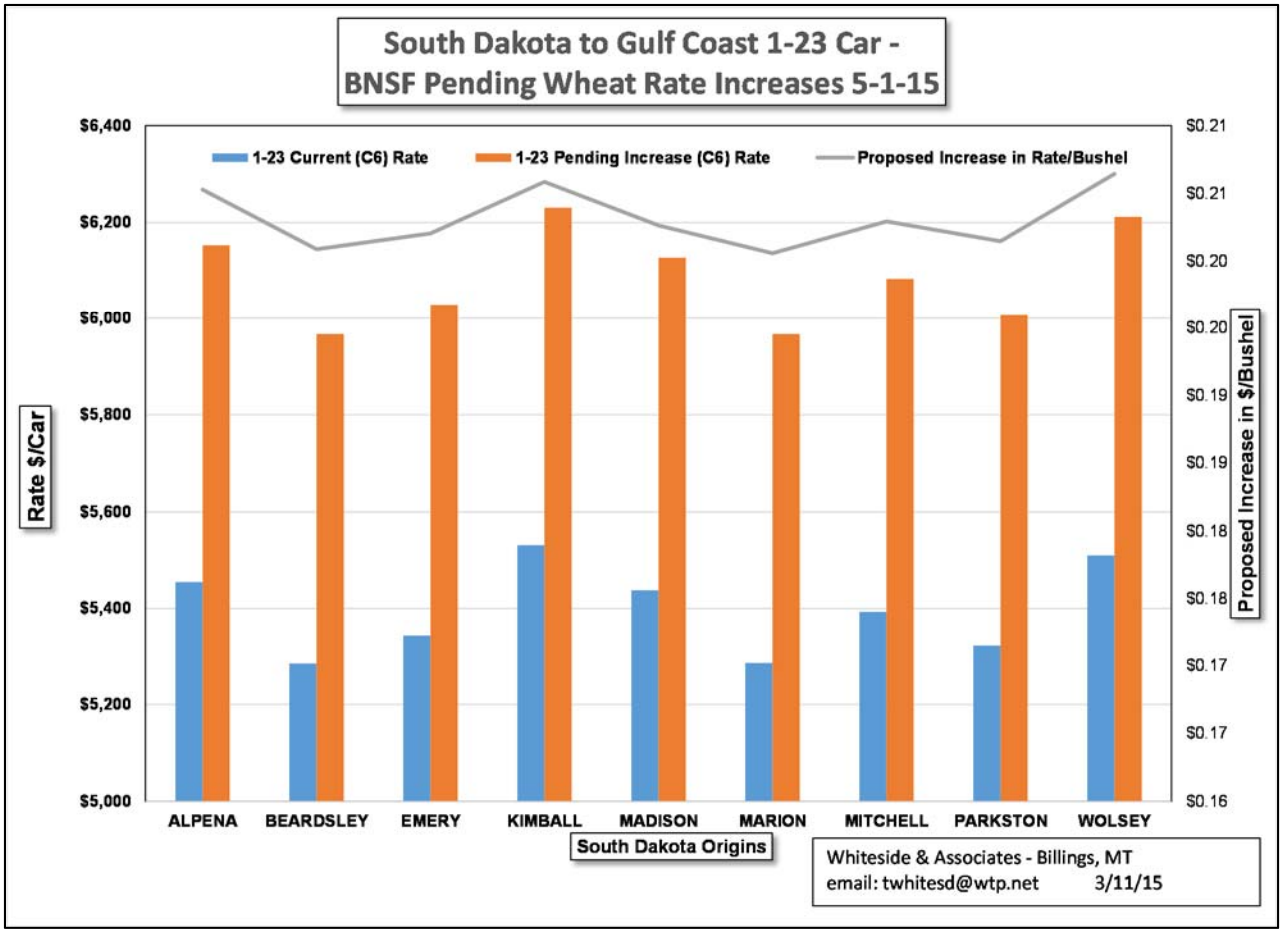
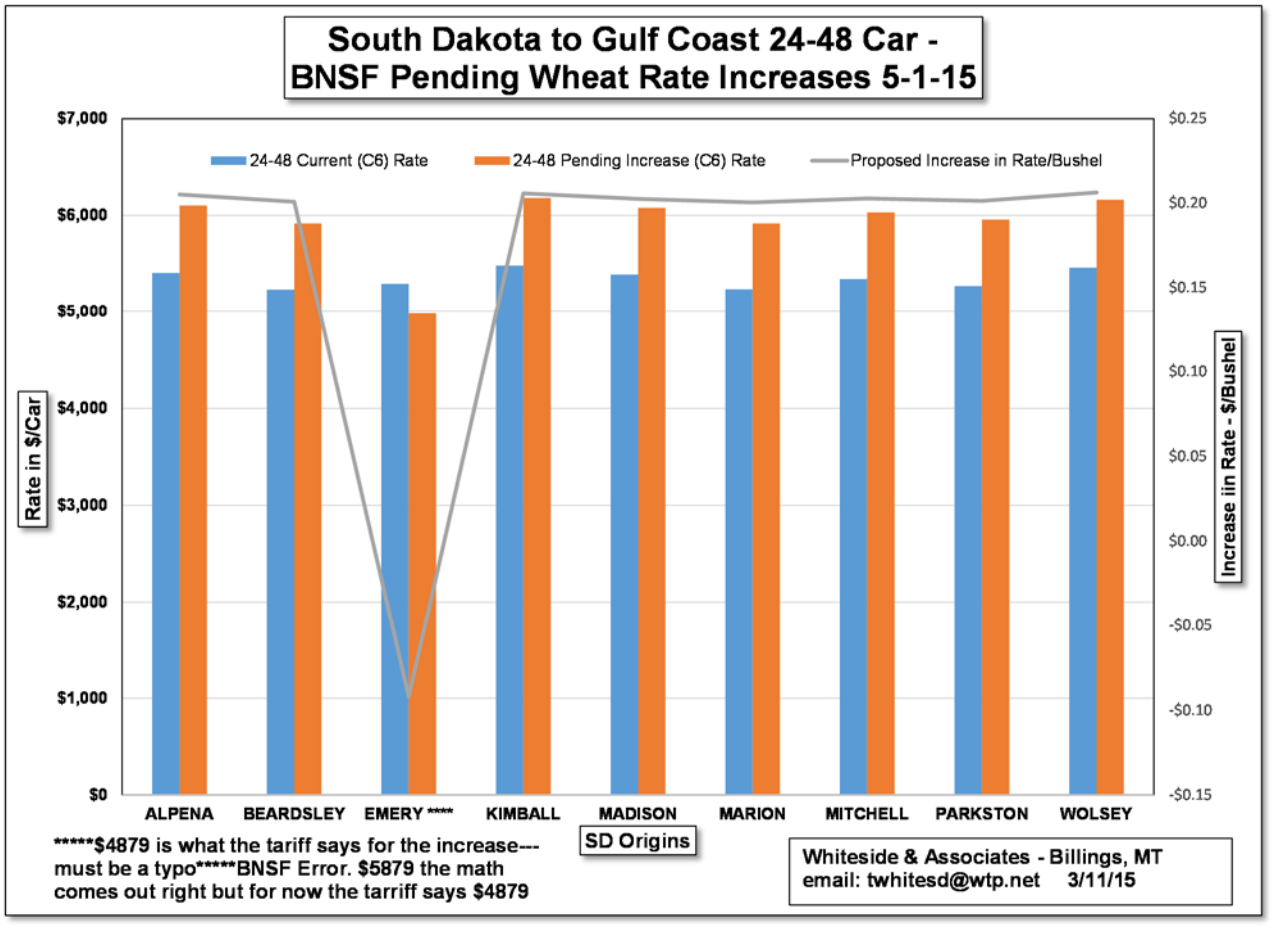
Billings, MT 59101, Phone: 406-245-5132 email: twhitesd@wtp.net



Above, the proposed SD to Gulf Coast increase in rates for the 1-23 cars are published in the C6 (286,000 #) cars.

Whiteside & Associates, 3203 Third Avenue North, Suite 301,
Billings, MT 59101, Phone: 406-245-5132 email: twhitesd@wtp.net



Above, the proposed SD to Gulf Coast increase in rates for the 24-48 cars are published in the C6 (286,000 #) cars.

Please Note: The rates published from Emery, SD to Gulf Coast are probably published with an error. *****$4879 is what the tariff says for the increase---must be a typo*****BNSF Error. $5879 the math comes out right but for now the tarriff says $4879

In the 3-09-15, we published the CO to Gulf Coast rates 24-48 car as C6X, the large covered hoppers – holding 286,0000#. It should have been for 24-48 for the C6 – holding 268,000# cars. We have republished the corrected chart below.

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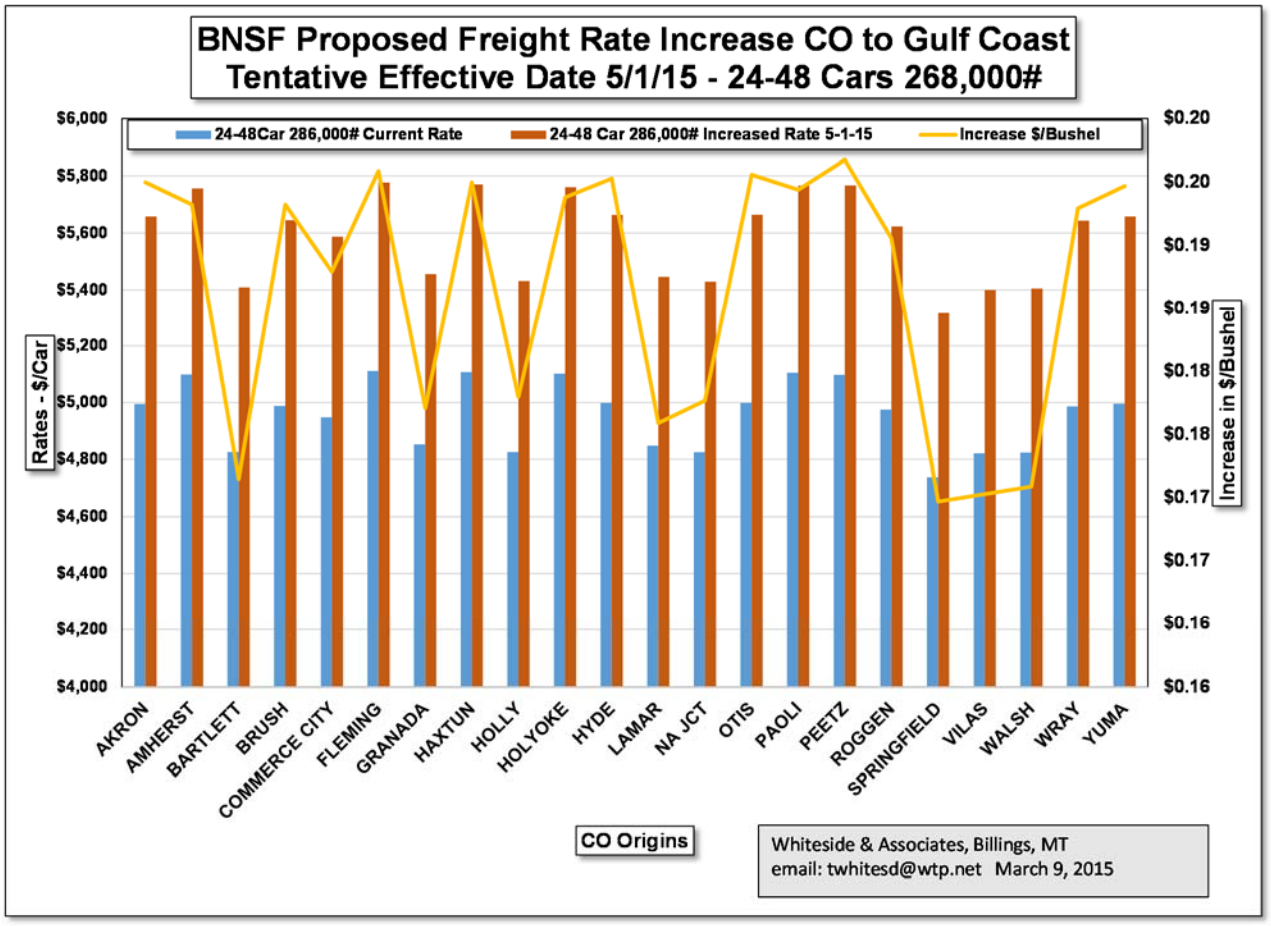

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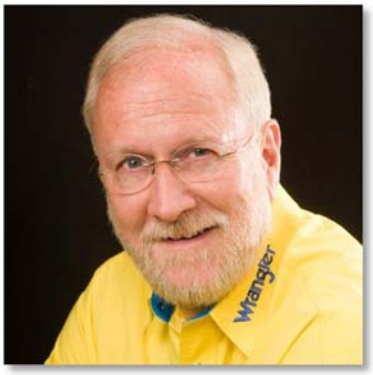
Billings, MT 59101, Phone: 406-245-5132 email: twhitesd@wtp.net

Whiteside & Associates

TRANSPORTATION UPDATE



From: Terry Whiteside

Date: March 20, 2015

SUMMARY OF BNSF FREIGHT RATE INCREASES THAT ARE SCHEDULED FOR MAY 1, 2015

While the BNSF has not published all of the anticipated increases, a number of rates in a number of states have been noticed in the pending BNSF files. Caution should be taken in viewing these numbers, as they are subject change before they are put into effect, however it is evident that the railroad is looking at major increases into the PNW and Gulf Coast markets.

In the coming days, we will continue to publish more charts on proposed increases by individual states. On March 9, 2015 we published the rates and proposed increases from MT to the PNW and from CO to the Gulf. On March 11, 2015 we published the rates and proposed increases from South Dakota, Nebraska and Colorado. If you need another copy of those reports, just drop us a note.

Today, we will examine KS to Gulf Coast, Oklahoma to Gulf Coast and Texas to the Gulf Coast pending rate increases.

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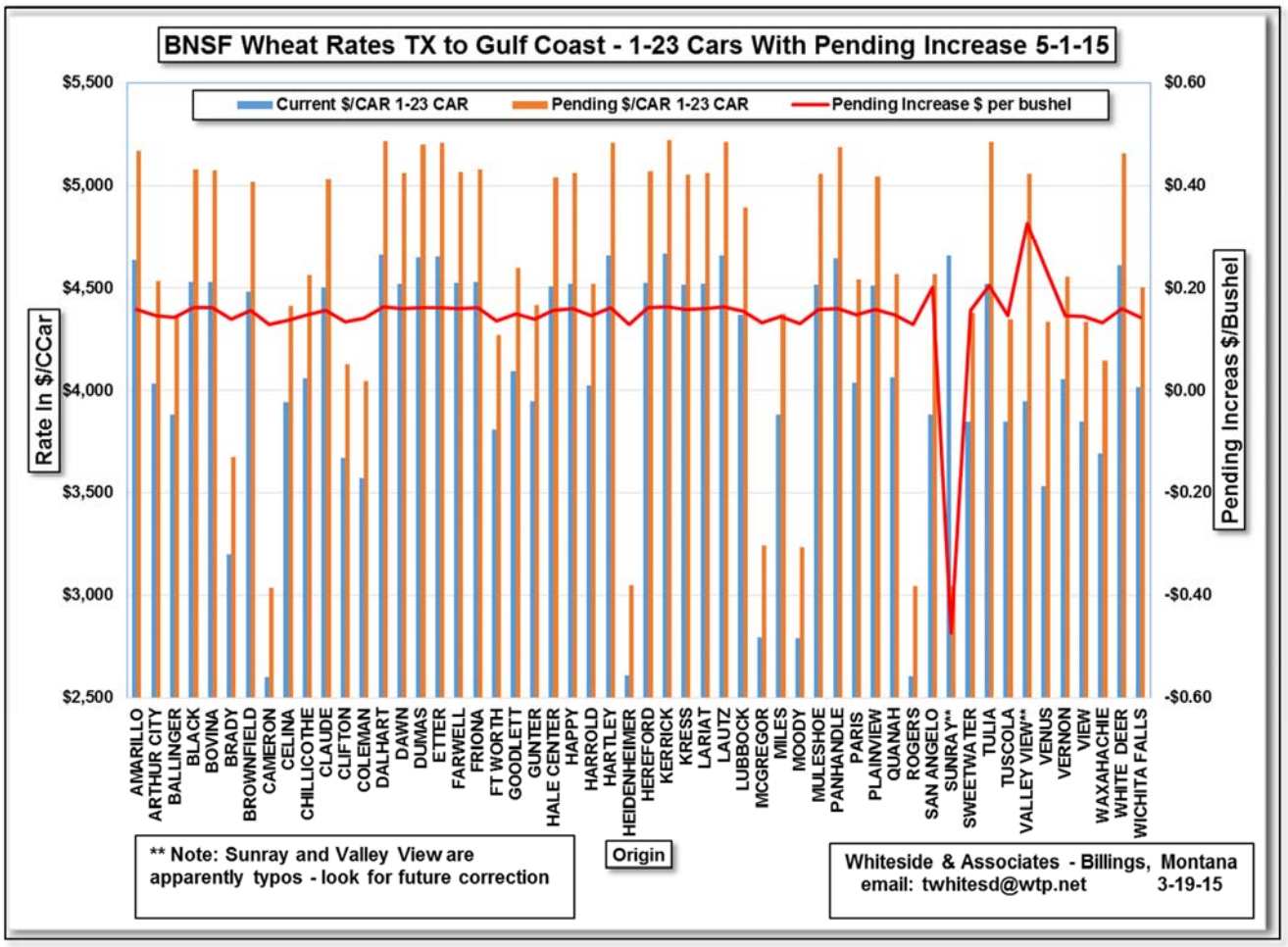

The Texas movements to the Gulf Coast are scheduled for rate increase of generally 20¢ - 30¢ per bushel effective 5-1-15. Please note that there appears two typos on the pending rates – Sunray and Valley View, TX. Look for a correction in the next few weeks.

The Texas rates have been published in the pending file.

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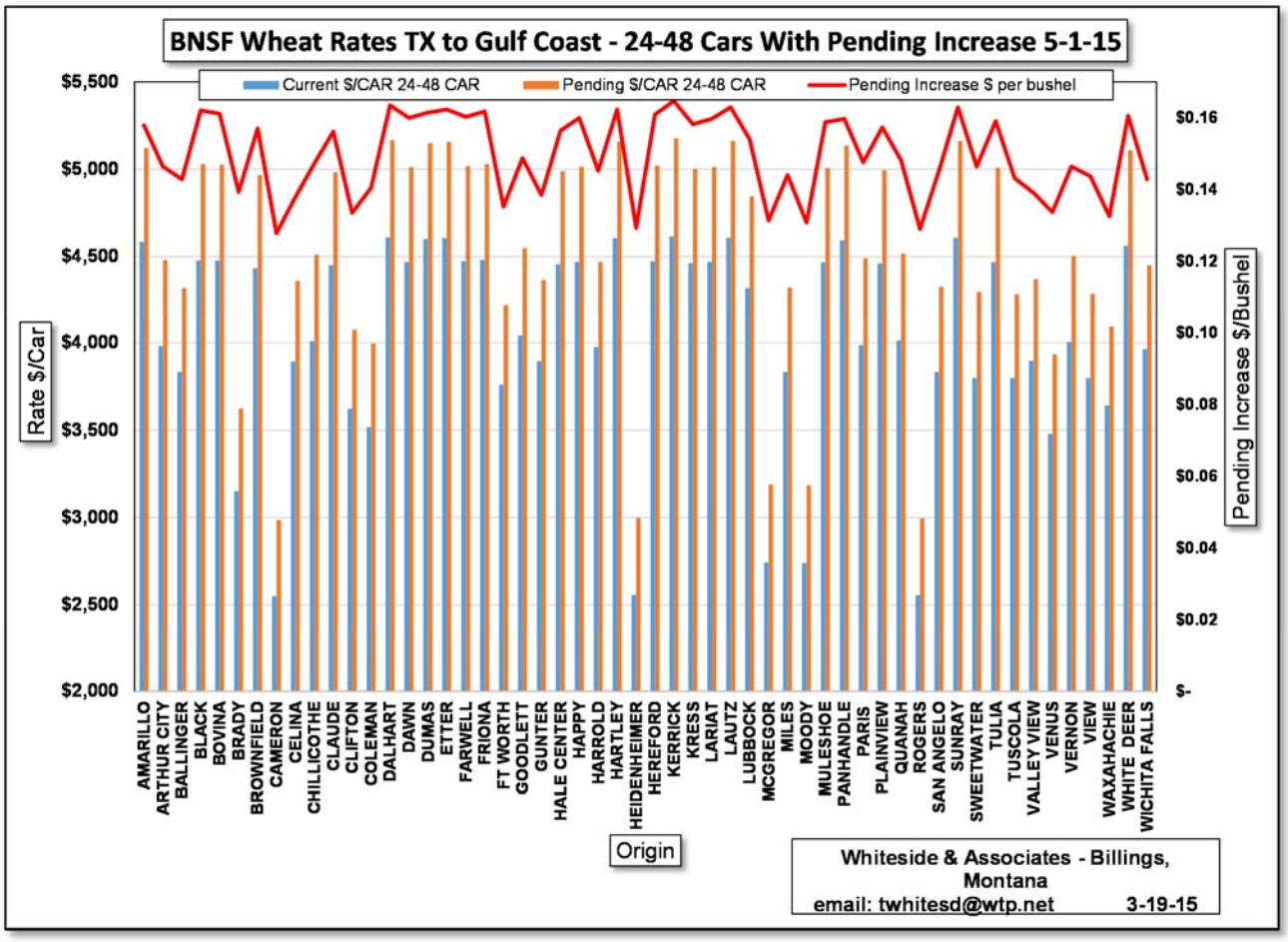

The OK to Gulf Coast increases have been published and outlined below are the 1-23 car and the 24-48 car rates.

Whiteside & Associates, 3203 Third Avenue North, Suite 301,
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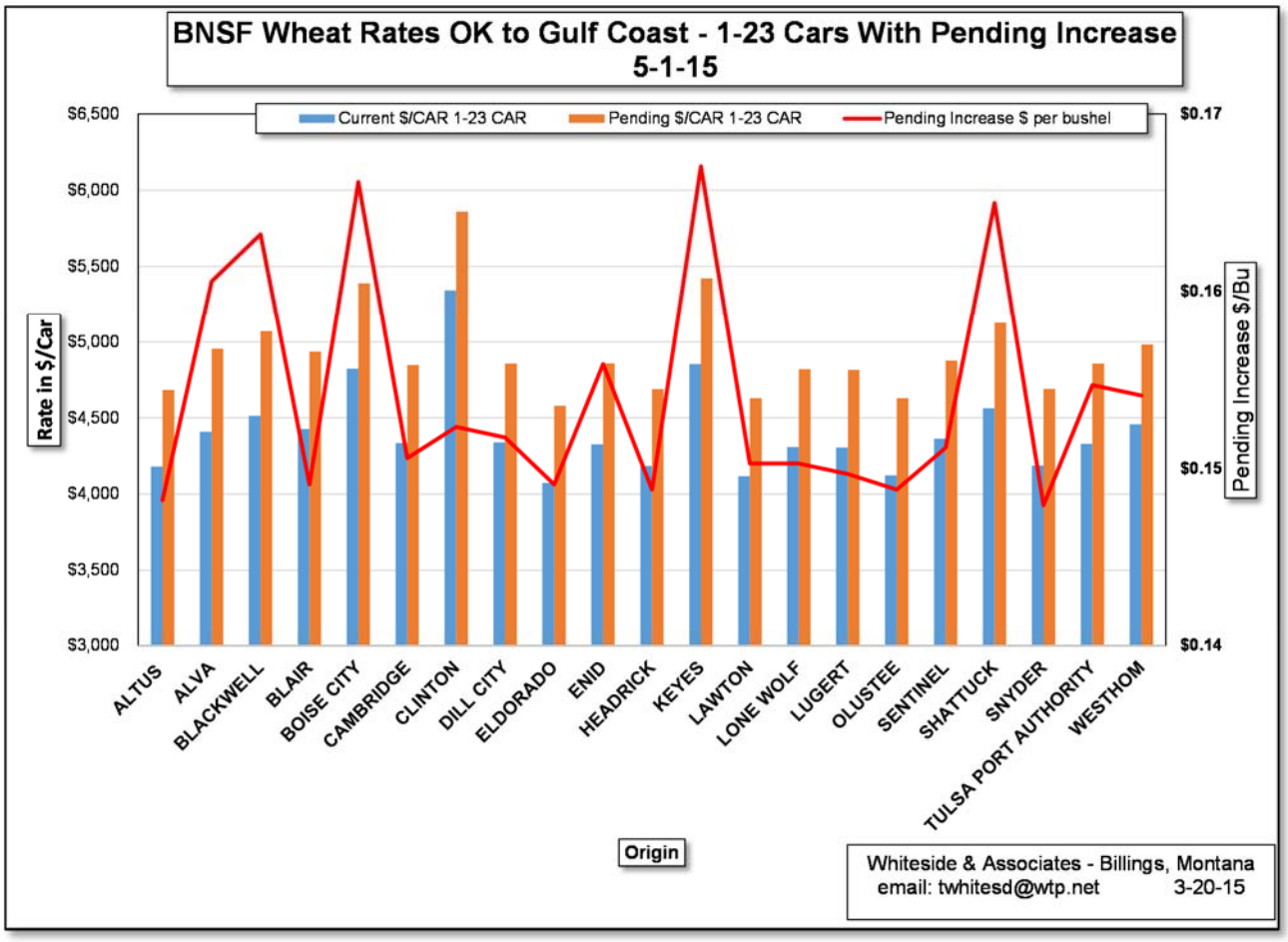

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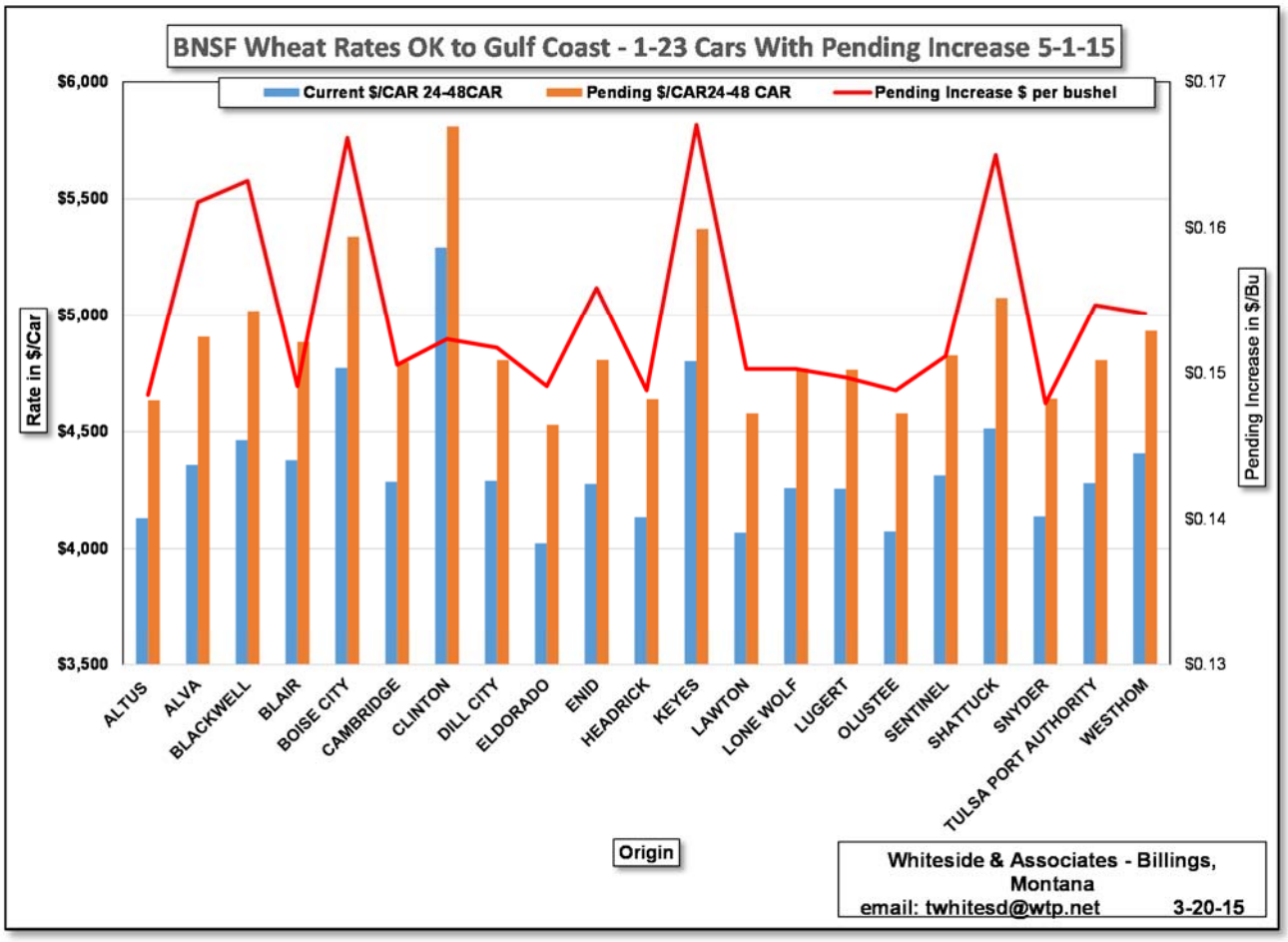

The KS to Gulf Rates for 1-23 Car are charted below on three different charts.

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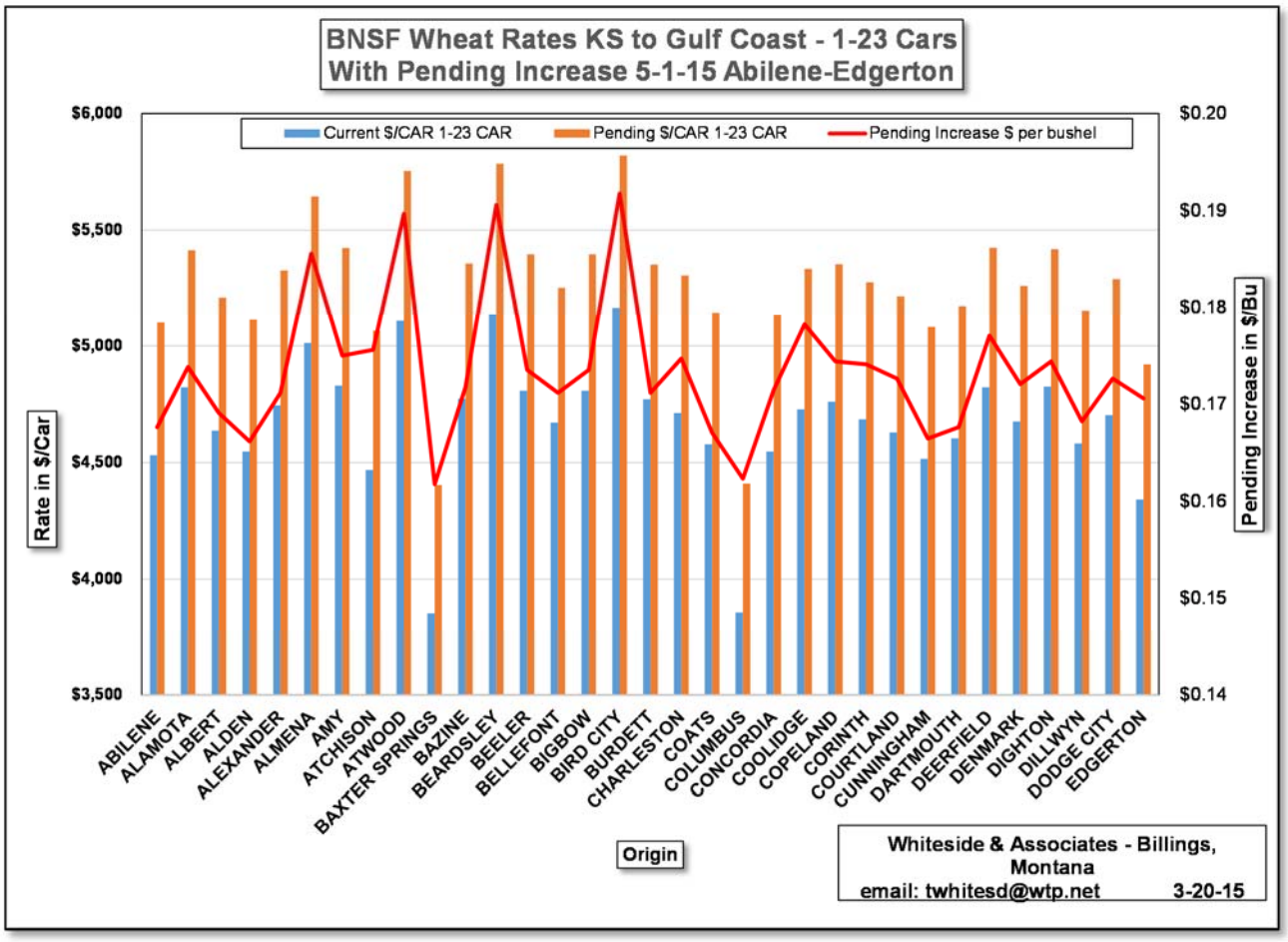

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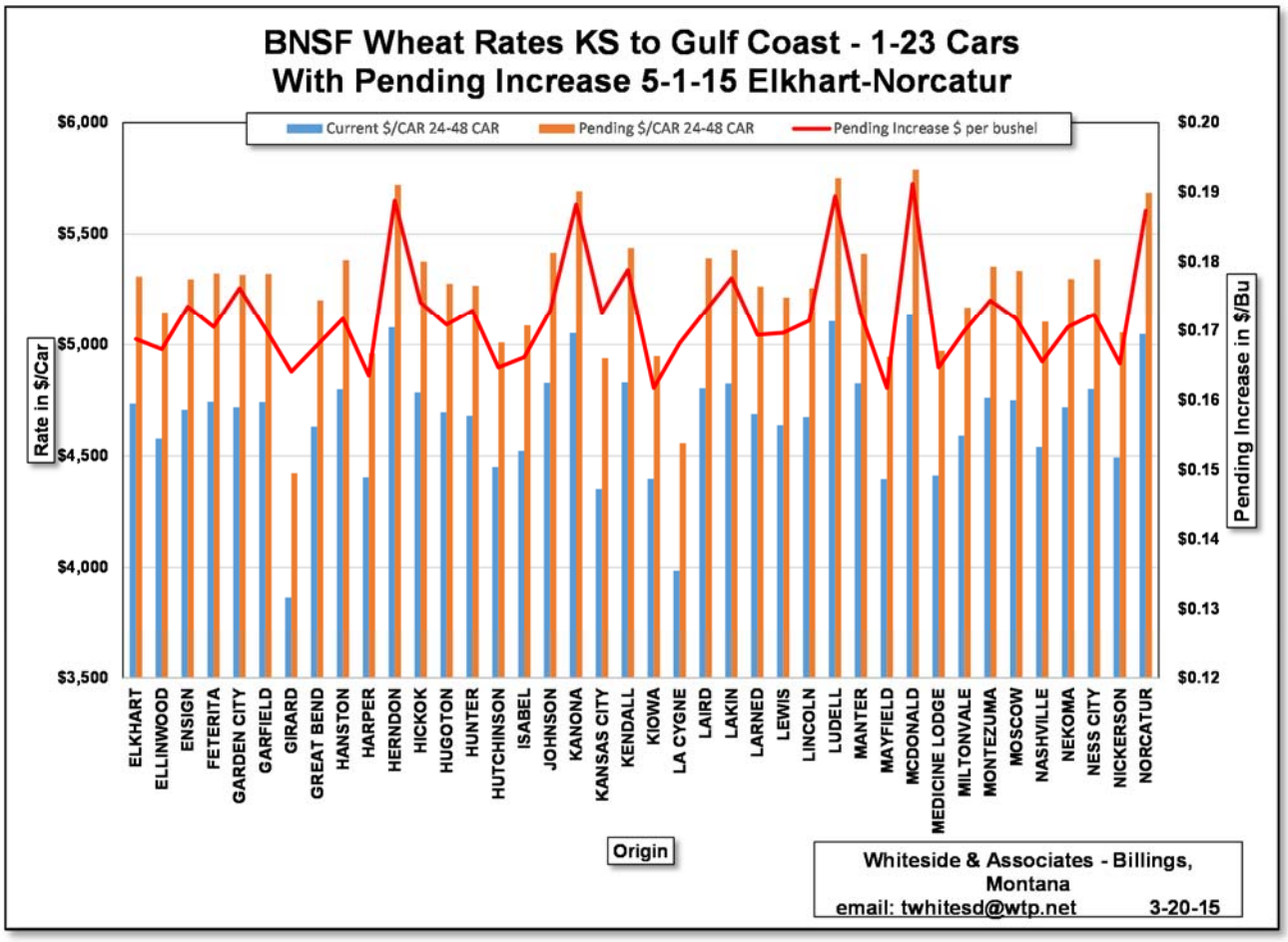

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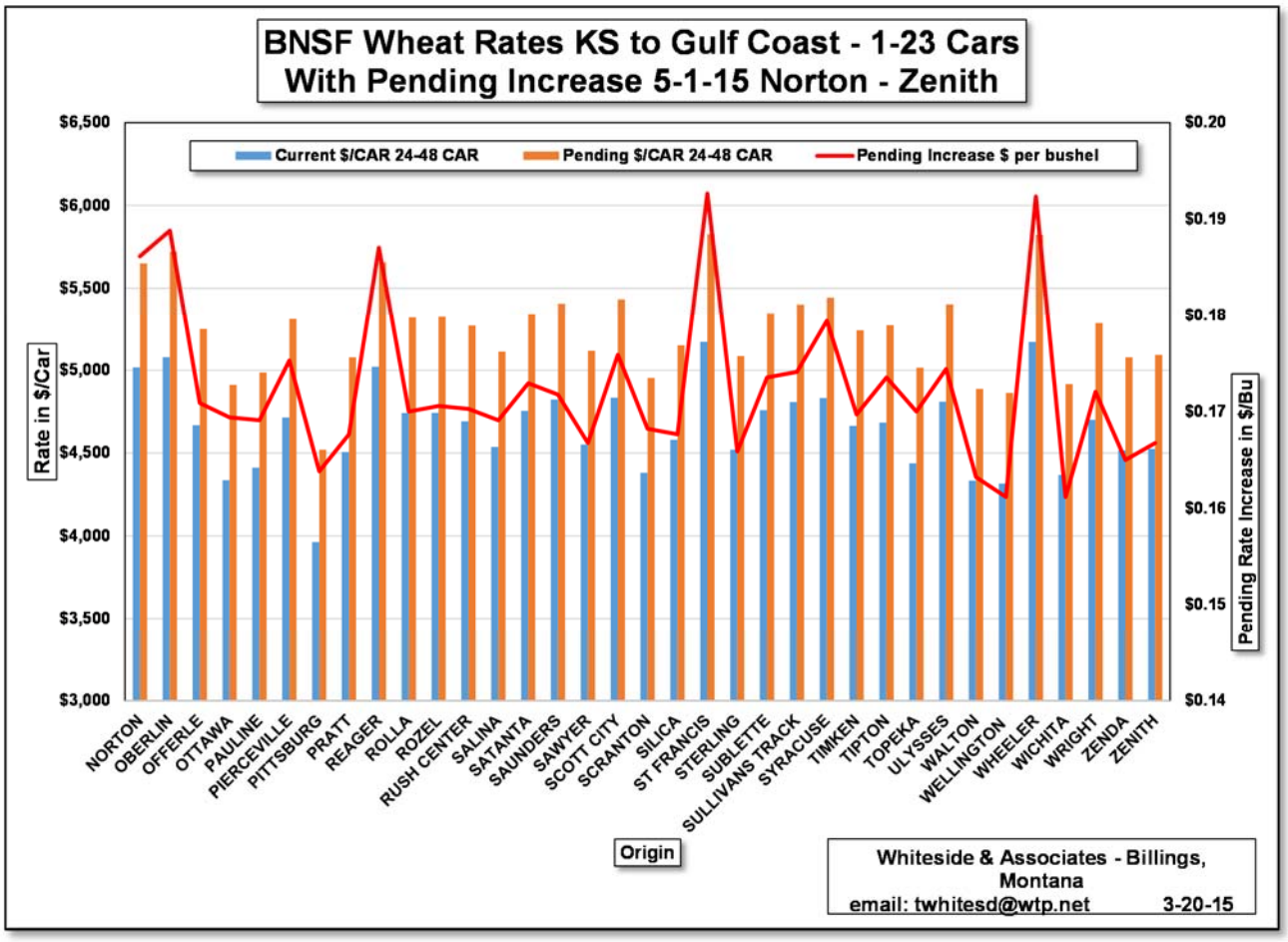

Next the KS to Gulf Coast 24-48 Car Rates.

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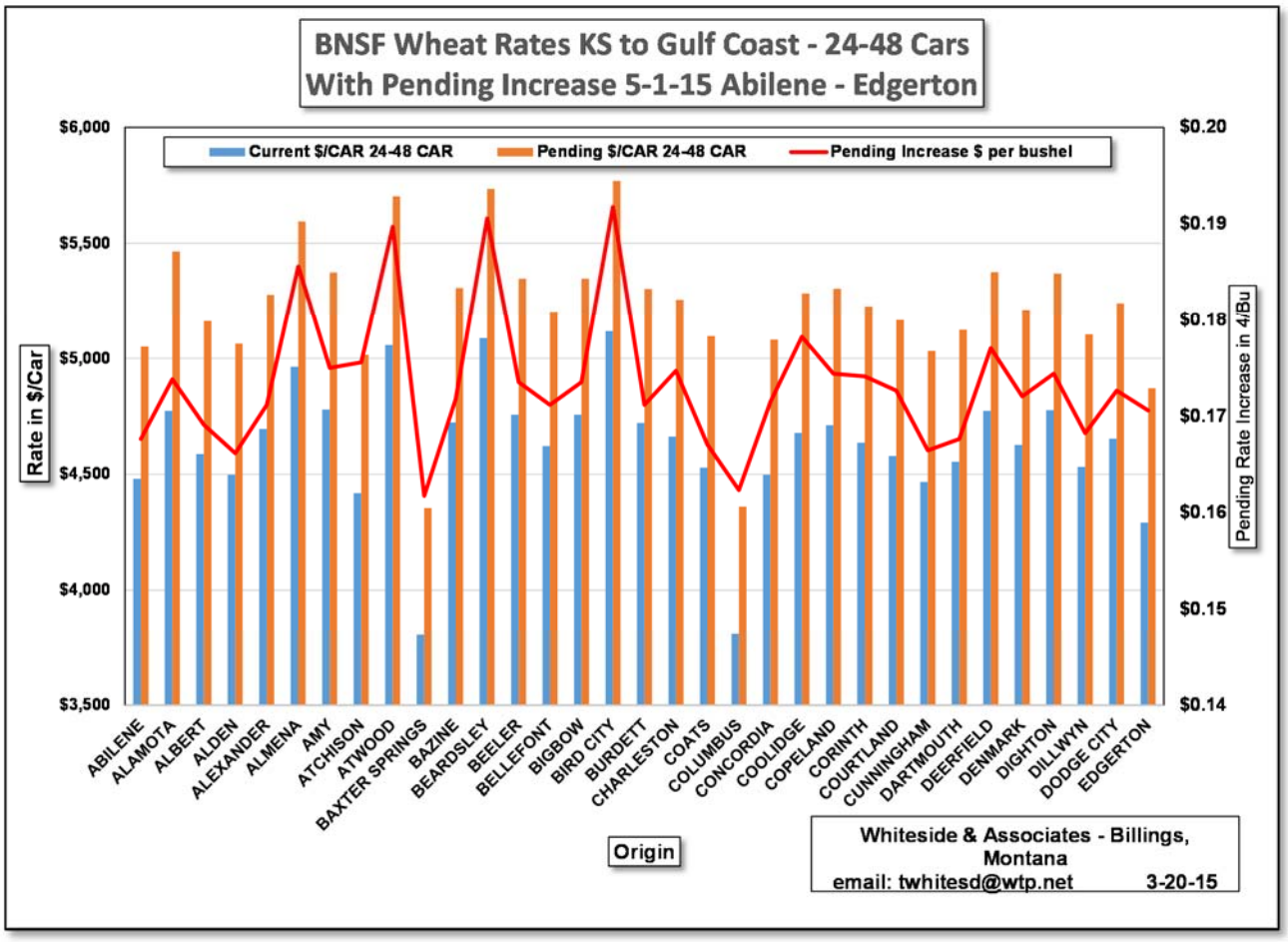

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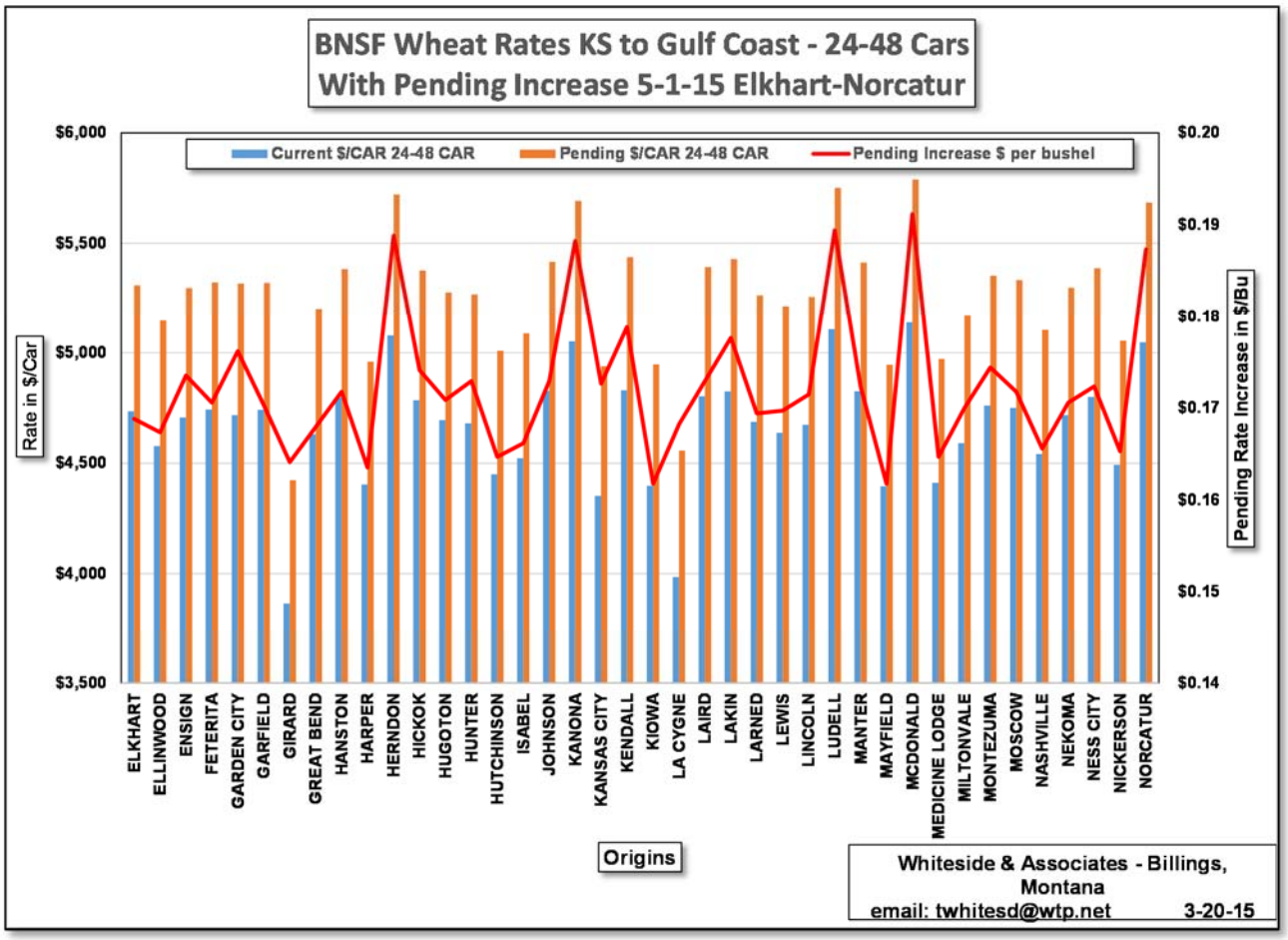

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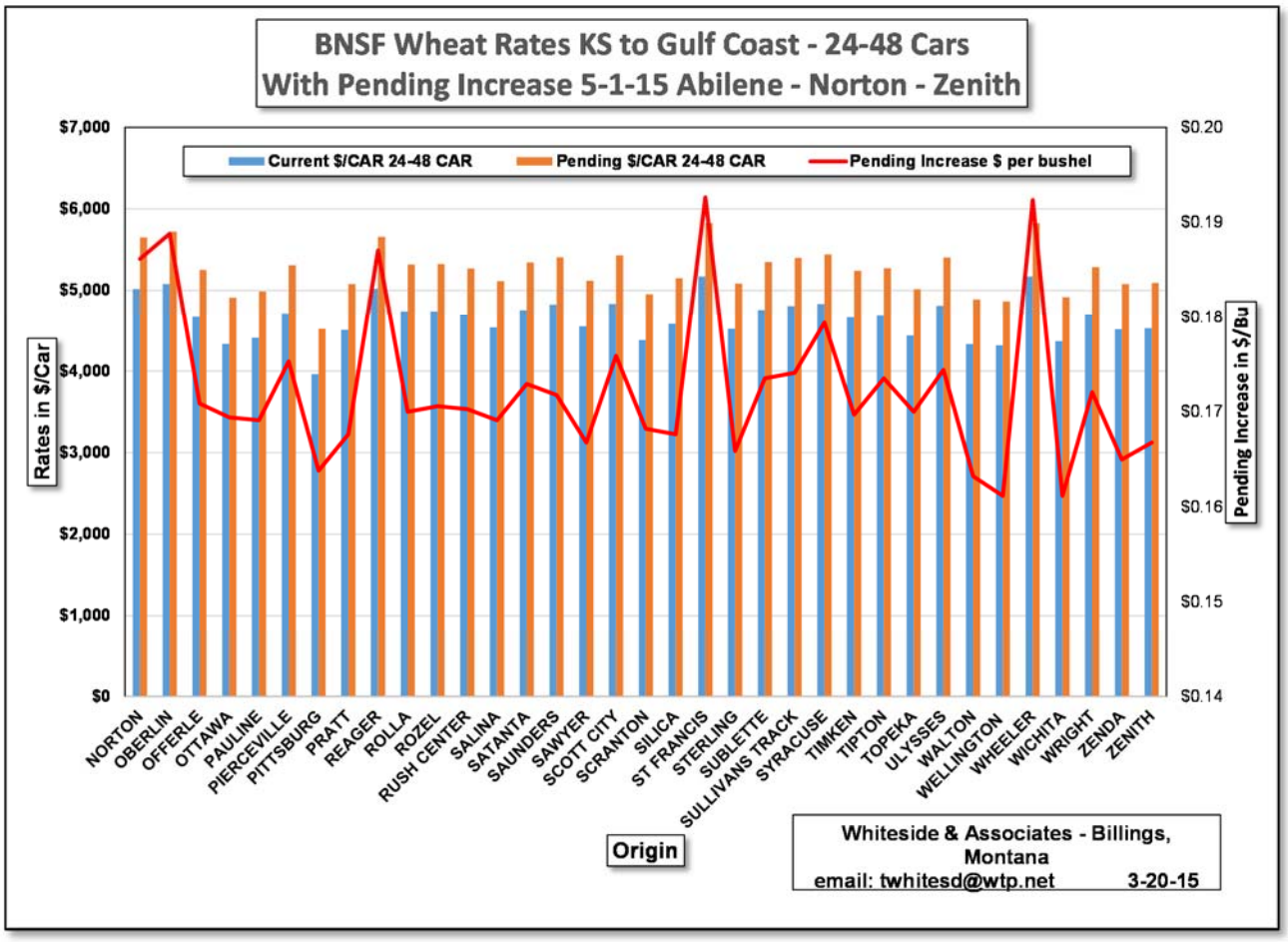

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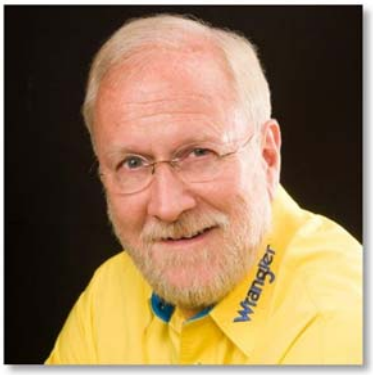

TRANSPORTATION UPDATE

From: Terry Whiteside

Date: March 23, 2015

S 808 - A BILL TO ESTABLISH THE SURFACE TRANSPORTATION BOARD AS AN INDEPENDENT ESTABLISHMENT, AND FOR OTHER PURPOSES

The bill now has a name and number – S 808. The following is a summary of how the substantive provisions in the rail regulatory reform legislation co-sponsored by Senators Thune and Nelson will impact shippers:

Sections 1 and 2. Non-substantive.

Section 3. This section establishes the Surface Transportation Board ("STB") as an independent agency, thereby removing it from under the Department of Transportation, where it has been since its creation in 1995. This will give the STB the same level of independence as its predecessor agency, the Interstate Commerce Commission ("ICC").

Section 4. This section expands the STB from three members to five. It should improve the efficiency of the agency, as well as reduce the need for members to rely upon staff to communicate with one another. Currently, no two members may meet to discuss matters before the agency because they would constitute a quorum and thus would be required to conduct any such discussion as a public meeting. Consequently, the members may

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communicate with each other only through their staffs. This expansion of the agency will enable two members to discuss matters among themselves without violating the Sunshine laws.

Section 5. This section improves communication among Board members by enabling even a majority of members to discuss official agency business without a public meeting provided that no vote or other official agency actions is taken, only Board members and employees are present, the Board's General Counsel is present, and a summary of attendees and matters discussed is made available to the public within specified time periods after the meeting. This section will improve Board efficiency while still preserving transparency and openness in the decision-making process.

Section 6. This section imposes certain reporting requirements upon the STB that should facilitate timelier agency actions. There is a new quarterly reporting requirement for rail rate cases designed to track compliance with the new rate case deadlines in Section 11. In addition, the agency must maintain a database of complaints that it receives and submit a quarterly report with basic information about the date, type, geographic region, and resolution of each complaint. By tracking and reporting the foregoing information publically, there should be a greater level of scrutiny and accountability of the STB.

Sections 7-10. Non-substantive or no impact on shippers.

Section 11. This section is designed to expedite rate cases, which currently average three years for the most complex cases, in three ways. First, it requires the STB to maintain a minimum of one simplified rate case process for use when a full stand-alone cost process is too costly, given the value of the case. Although the STB has simplified procedures in place currently, there is no statutory requirement for it to do so and there has been some debate over whether there can be more than one simplified process. Second, this section imposes a timeline on full stand-alone cost (i.e., large) rate cases that would shorten the process to just 18 months from complaint to decision, subject to extensions if requested by the parties. Third, this section requires the STB to initiate a proceeding to assess whether any of the procedures used to expedite judicial litigation could be applied effectively to expedite rate cases.

Section 12. This section restores the STB's authority to initiate investigations on its own initiative. Currently, the STB can only exercise its

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authority upon receiving a formal complaint, which many shippers are reluctant to initiate. This new authority must be conducted within specified parameters and time periods; is limited to issues of regional or national significance, as opposed to matters specific to individual shippers; and would be subject to *de novo* judicial review, instead of the more deferential arbitrary and capricious standard for investigations initiated by a formal shipper complaint.

Section 13. This section codifies much of the STB's recently-adopted arbitration procedures but with several minor and two significant changes. The most significant change is the expansion of arbitration to rate cases. The STB must first decide whether market dominance exists and the arbitrators must consider the STB's methodologies for determining reasonable rates. The second significant change increases the relief caps for non-rate case arbitrations from $200,000 to $2,000,000, and adopts a rate case relief cap of $25,000,000 over 5 years. The STB may review arbitration decisions to determine if they comply with the statute and the relief caps, or are based upon sound economic principles.

Section 14. This section requires the Comptroller General to commence a study of rate bundling, which many shippers complain precludes them from challenging just those rates that they deem unreasonable. This is a first step in finding a solution for this issue.

Section 15. This section requires the STB to submit two different types of reports. First, the STB must report within one year on rate case methodologies. This report must address the sufficiency, complexity and cost effectiveness of the current large case methodology, and indicate whether alternative methodologies exist or could be developed to address the foregoing issues, provided that such alternatives are consistent with sound economic principles. This reporting requirement will help to keep the search for rate case alternatives at the forefront of the STB's agenda, instead of allowing the issue to languish in unfinished STB proceedings.

Second, the STB must submit quarterly reports to describe the progress it has made in all unfinished regulatory proceedings. The STB has allowed past public inquiries and regulatory proceedings to languish in obscurity without taking any definitive action. This section will reduce that risk as to future proceedings by requiring regular status reports.

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Section 16. This section adds clarifying language to the statutory determination of revenue adequacy, but without any intent to change how the STB determines revenue adequacy. Additionally, the Committee has indicated a willingness to include report language to reinforce this interpretation.

Section 17. This section clarifies that the provisions of this legislation do not affect pending STB proceedings.

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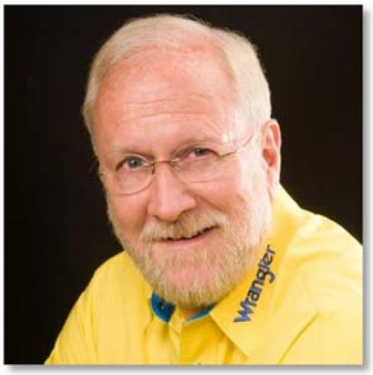

TRANSPORTATION REPORT

From: Terry Whiteside

Date: March 25, 2015

FLASH: SENATE COMMERCE COMMITTEE UNANIMOUSLY PASSED THIS AFTERNOON S. 808 - SURFACE TRANSPORTATION BOARD REAUTHORIZATION ACT OF 2015!

Whiteside & Associates, 3203 Third Avenue North, Suite 301,
Billings, MT 59101, Phone: 406-245-5132 email: twhitesd@wtp.net

MANUFACTURERS, AGRICULTURE AND ENERGY PRODUCERS CALL ON CONGRESS AND THE STB TO UPDATE RAIL POLICIES

WASHINGTON (March 25, 2015) – A large group of national trade associations representing manufacturers, agriculture and energy producers together with the Alliance for Rail Competition, Idaho Grain Producers Association, Wyoming Wheat Marketing Commission, and the Nebraska Wheat Board today announced they have formed the Rail Customer Coalition. The Coalition is calling on Congress and the Surface Transportation Board (STB) to modernize the nation's freight rail polices to better serve shippers, their customers, railroads and American consumers. Specifically, the Coalition strongly supports the "Surface Transportation Board Reauthorization Act of 2015" that was drafted under the leadership of the U.S. Senate Committee on Commerce, Science & Transportation Chairman John Thune (R-S.D.) and Ranking Member Bill Nelson (D-Fla.).

The Coalition has also launched a new website highlighting the need for freight rail reform and released new research that found rising rail rates are taking a growing toll on American businesses.

"Our groups believe it is time to review key aspects of rail policy and adopt common-sense improvements to ensure that the U.S. is on course to meet the needs of rail carriers, shippers and the public," said Bob Stallman, President of the American Farm Bureau Federation.

Momentum is growing on Capitol Hill to enact legislation that will increase rail-to-rail competition and improve how freight rail issues are resolved. The Coalition's goals are to educate lawmakers on the growing problems that are impacting rail customers and to offer meaningful, reasonable and workable solutions.

"As the auto industry continues to rebound from the economic downturn, automakers have encountered persistent rail service issues, resulting in an unprecedented disruption in the ability to deliver vehicles to customers. These service problems are not unique to the auto industry. Together, our groups believe it is time to review key aspects of rail policy and adopt common-sense improvements to ensure that the U.S. is on course to meet the needs of rail carriers, shippers and the public," said Shane Karr, Vice President of Federal Government Affairs at the Alliance of Automobile Manufacturers.

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The STB Needs to Be Modernized

Congress has not revisited the nations' freight rail policies since it created the STB. It's clear the Board's current policies have not been able to keep up with the massive changes in the freight rail industry or achieve the goals that Congress established in 1980 when it passed the Staggers Rail Act.

The "Surface Transportation Board Reauthorization Act of 2015" would reauthorize and make substantial changes to the STB, the only government entity responsible for handling commercial freight rail issues, and would modernize the Board for the first time since its creation. In addition to streamlining how the STB operates, the legislation would help improve how the Board handles rate and service issues.

"We've reached a tipping point where the lack of competitive rail service is having a serious impact on American businesses," said Philip K. Bell, President of the Steel Manufacturers Association. "At the same time, the Surface Transportation Board's slow and burdensome processes leave many shippers with no competitive options and no feasible way to challenge unreasonable rates."

New Research Shows Rates Continue to Soar

The Coalition released new economic research that shows an all too familiar pattern—soaring freight rail rates. According to a new report, rates have doubled since 2001, which negatively impacts a broad spectrum of businesses and industries.

To determine the rate premium American producers pay on each shipment, Escalation Consultants used publicly available data to calculate the railroads' revenue-to-variable cost ratio (RVC) for millions of carloads of rail traffic. The report found the following:

· In 2013, two-thirds (67 percent) of all rail rates exceeded 180 percent RVC, making them subject to potential STB review for being unreasonably high.

· From 2005 to 2013, the total rate premium paid by commodity shippers increased 121 percent even though carload volume declined by 2.4 percent.

· As a result, the total rate premium paid by commodity shippers in 2013 was over $18 billion.

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· The commodity groups with the largest total rate premiums were chemicals and plastics ($5.3 billion), coal ($4.1 billion) and automobiles and other transportation equipment ($1.7 billion).

· Many rates were far above the STB's jurisdictional threshold of 180 percent RVC; for example, one quarter (25 percent) of rates exceeded 300 percent RVC, or three times the railroad's variable cost.

"Chairman Thune and Ranking Member Nelson have carefully crafted a smart and significant proposal that reflects the input of numerous stakeholders and responds to the growing support for modernizing the STB," said Cal Dooley, President and CEO of the American Chemistry Council. "The reasonable reforms in this bill will make many important changes, such as streamlining the STB's overly burdensome rate review standards, providing reasonable arbitration procedures to resolve rate disputes, and allowing the STB to be more proactive in resolving freight rail issues. Moreover, the legislation will allow both railroads and shippers to thrive, while encouraging the growth of the U.S. economy."

The Coalition is urging Congress to pass the "Surface Transportation Board Reauthorization Act of 2015" and also urging the STB to follow through on reforms that will increase access to competitive service and will allow the Board to operate more efficiently and effectively.

More information on making freight rail more affordable and reliable can be found at the Rail Customer Coalition's new website, www.freightrailreform.com.

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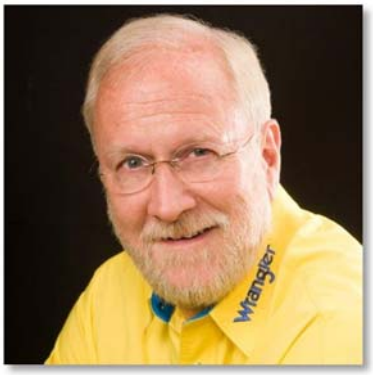
Whiteside & Associates



TRANSPORTATION UPDATE

From: Terry Whiteside

Date: March 9, 2015

SUMMARY OF BNSF FREIGHT RATE INCREASES THAT ARE SCHEDULED FOR MAY 1, 2015

While the BNSF has not published all of the anticipated increases, a number of them have been noticed in the pending BNSF files. Caution should be taken in viewing these numbers, as they are subject change before they are put into effect, however it is evident that the railroad is looking at major increases into the PNW and Gulf Coast markets.

In the coming days, we will publish more charts on proposed increases by individual states.

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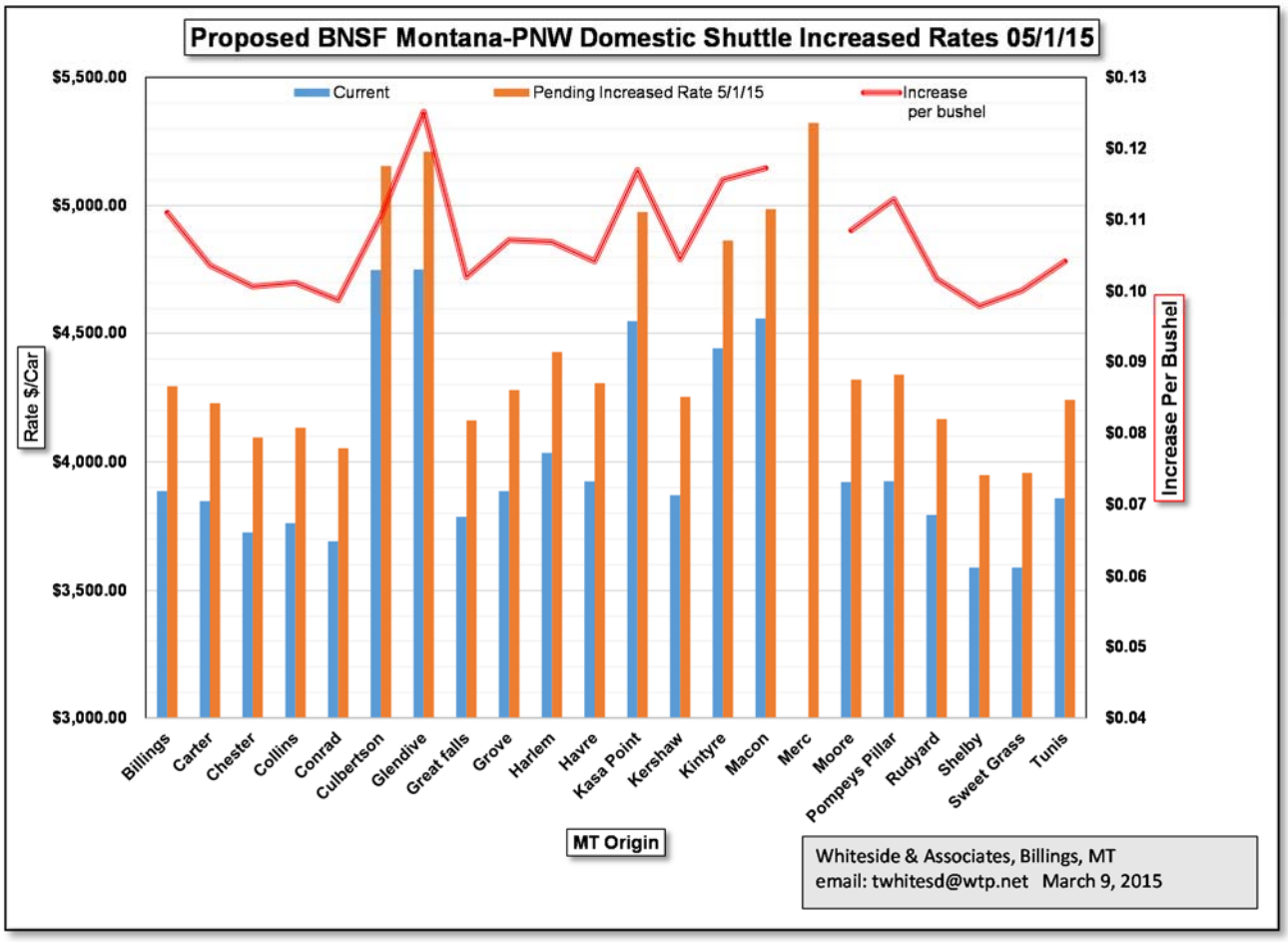

Montana shuttle rates are published to the PNW for both domestic and export movements. The proposed domestic shuttle rates have been published and they are outlined above. The export shuttle rates have not as of this date been published. Traditionally, the export rates are published at $109/car less than domestic rates, and based on the traditional differential, the chart below reflects a best 'guess' at the yet-to-be proposed export rates from MT to PNW.

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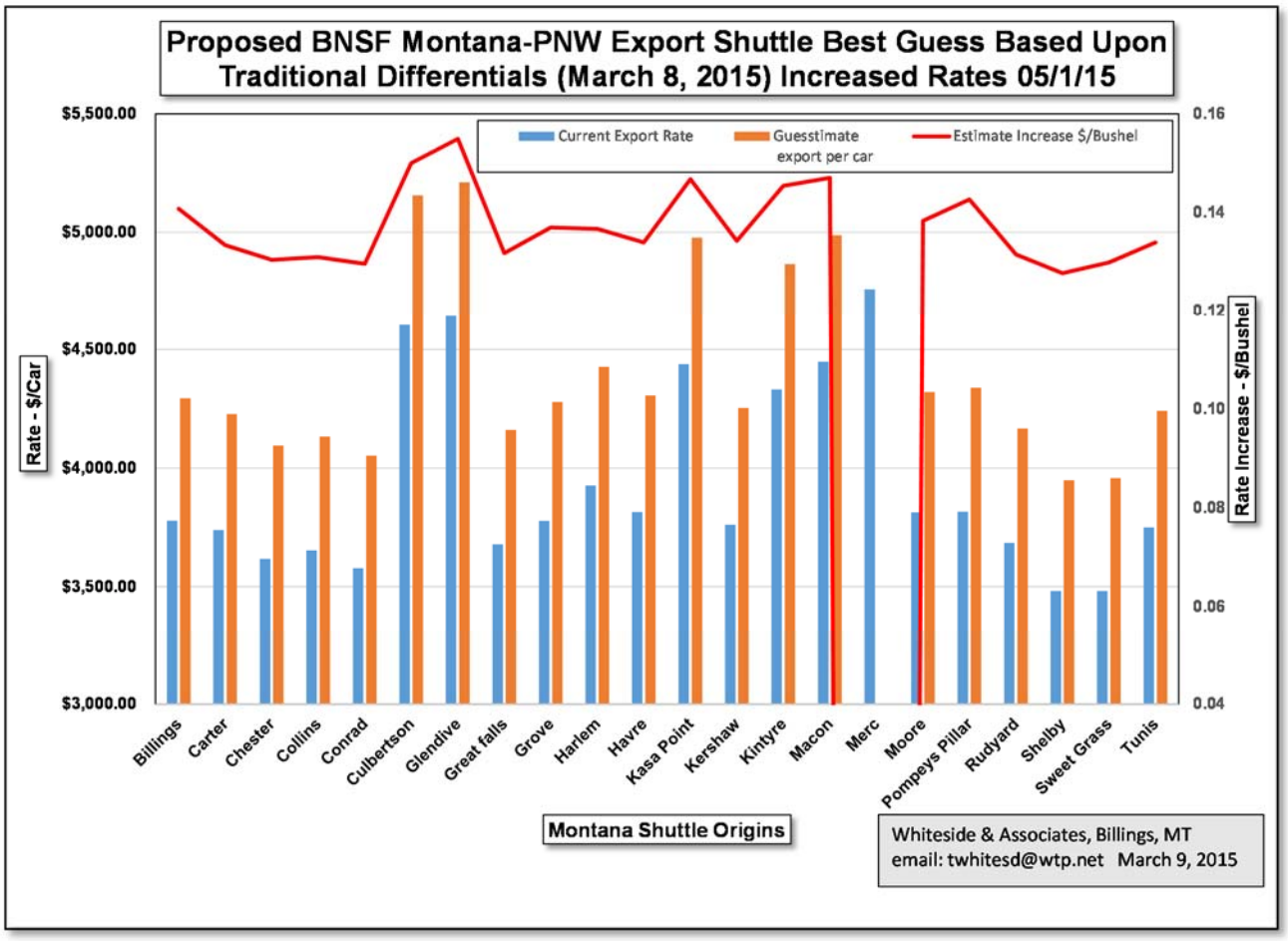

The CO to Gulf Coast increases have been published and they are reflected below for both the 1-23 and 24-48 car levels.

Also it should be noted any change to the CO to PNW rate structures have not been published as of this date.

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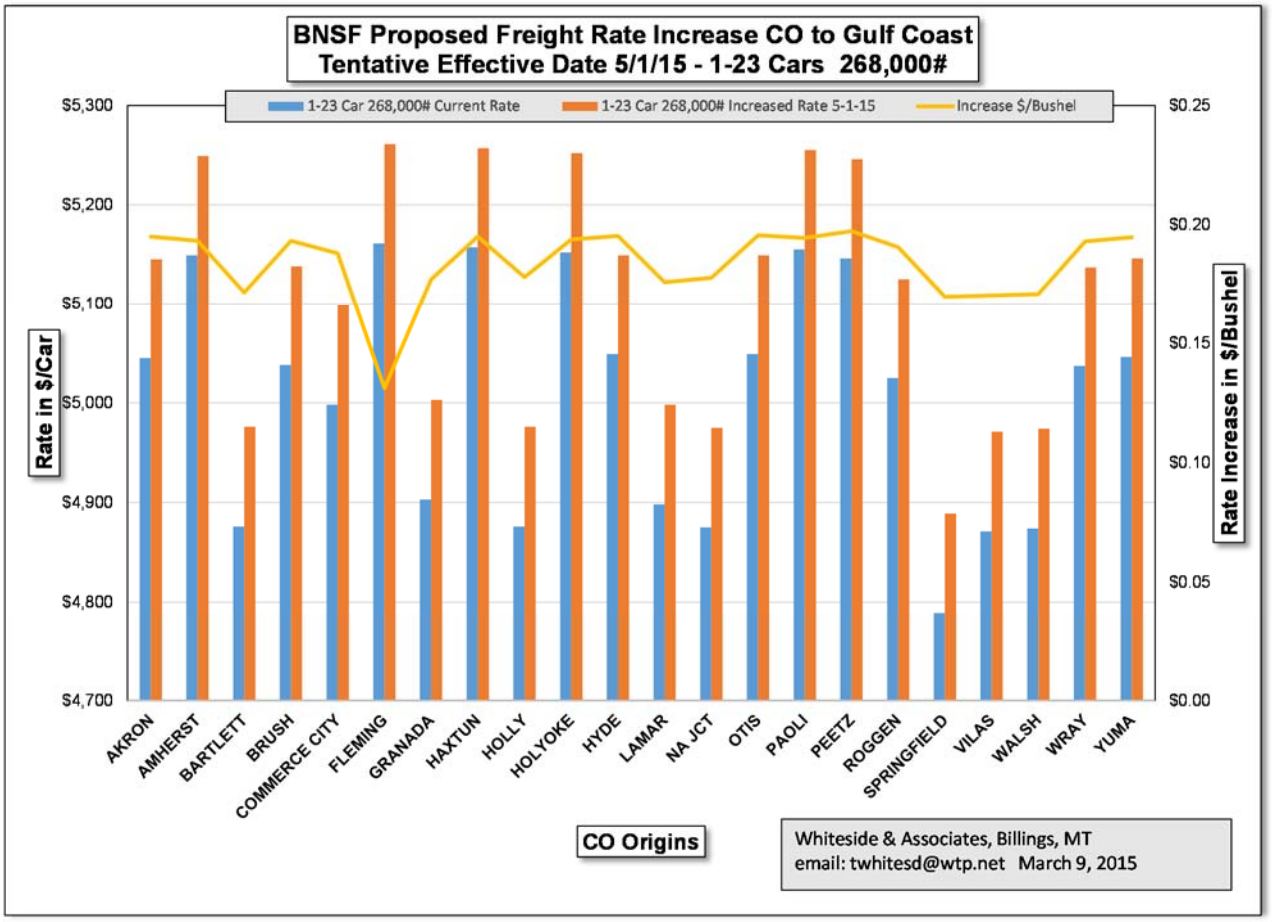

Above, the proposed increase in rates for the 1-23 cars are published in the C6 (268,000 #) cars.

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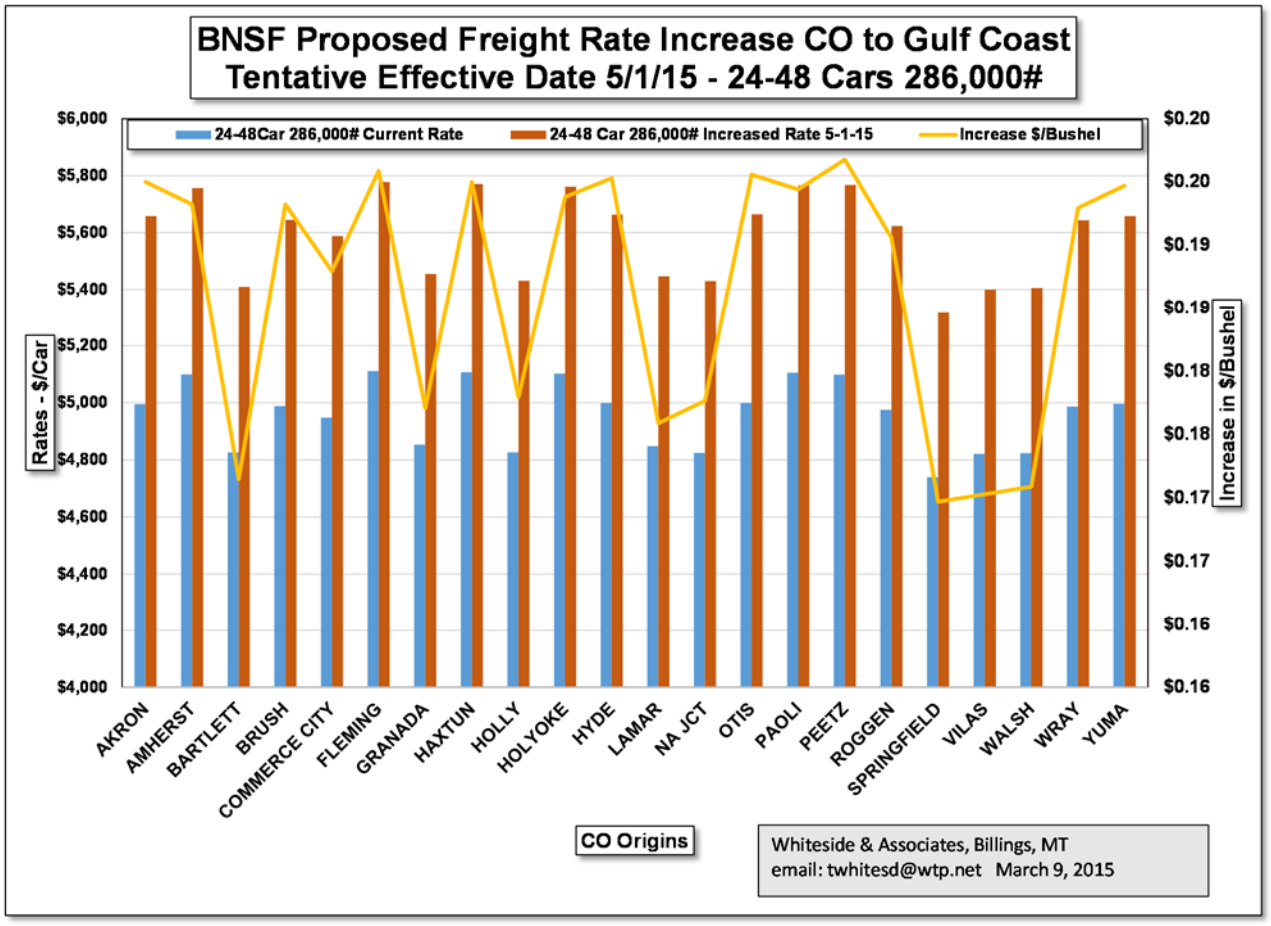

Above, the proposed increase in rates for the 24-48 cars are published in the C6X (286,000 #) cars.

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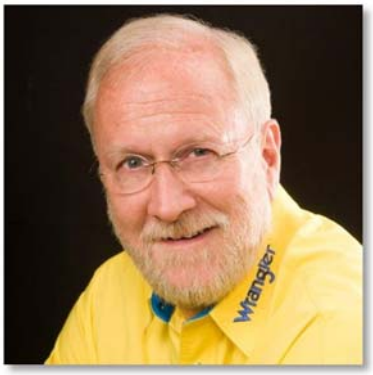

TRANSPORTATION REPORT

From: Terry Whiteside

Date: May 14, 2015

HOUSE TRANSPORTATION AND INFRASTRUCTURE COMMITTEE (T&I) HOLDS HEARING ON RAIL REGULATORY ISSUES

The House Transportation Committee held its hearing on rail regulatory issues yesterday. This was the first hearing the Committee has held on these issues for at least 5 years, and the panel included acting Chairwoman of the STB Deb Miller, ACC President Cal Dooley, AAR President Ed Hamberger, Short Line Association President Linda Darr, and Georgetown Professor John Mayo.

The purpose of the hearing was to review the economic regulatory landscape for the freight rail industry. Predictably, there was a lot of discussion of the freight rail renaissance, and the capital investments needed to maintain and grow the rail network. Both Deb Miller (Acting Chairman of STB) and Cal Dooley (CEO of the American Chemistry Council and members of the Rail Customer Coalition) effectively highlighted many of the issues that this coalition supports—related to the lack of efficiency and effectiveness at the STB, and the actions underway at the agency.

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There was also conversation about the unreasonable cost and burden associated with the current system, and the chilling effect that puts on rail shippers to utilize the process. Ms. Miller spoke at length about the efforts underway at the STB to implement reforms, and Mr. Dooely highlighted that even in an industry where companies can sometimes afford to dispute a rate, few do because of numerous institutional and structural barriers. For smaller rail shippers, the existing process is effectively useless.

Mr. Dooley also highlighted this quote from Mr. Hamberger's testimony that needs to shared with this Coalition and all rail shippers, that was part of AAR's lengthy attack on the merits of the Rail Customer Coalition's policy objectives:

> "Indeed, when one looks behind the actions that proponents of reregulation are urging upon Congress and the STB to "reform" freight rail policy, it is clear that "reform" is a euphemism for "force railroads to subsidize us" and that the needs of the railroads and the general public are a distant second to their own narrow desires."

It should be pointed out point out that the Rail Customer Coalition does not support "reregulation" (and Mr. Hamburger/AAR knows it)—it supports reasonable, non-prescriptive reforms to the STB to improve their processes, such as those in S. 808, as well as policies to promote competition that are consistent with the principals in the Staggers Act.

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AAR's advocacy focuses on protecting what even the STB Board Members acknowledge is an unacceptable status quo at the STB, and preventing railroads from having to compete with each other for business.

Another note of fact: we also wanted to note that the Professor/ Economist on the panel-- that was called on by members of the Committee for "unbiased" opinions on the state of rail regulation-- recently authored an academic paper on railroad revenue adequacy that was financed by the Association of American Railroads. This was not disclosed during the hearing or in any of the associated materials made available to us.

As stated by one of the shippers – in a discussion with Congress and the railroads, sadly the first casualty may be the truthfulness of the railroad experts.

The Rail Customer Coalition is a strong shipper based DC organization with members from a broad array of industries. Outlined below is copies of the Rail Customer Coalition webpages outlining current events occurring in rail transportation around Washington DC. www.FreightRailReform.org

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Thanks to our collective efforts through the Rail Customer Coalition, momentum is continuing to build for modernizing the Surface Transportation Board (STB). This is a quick summary of some of the more notable developments.

STB Nomination Hearing in the Senate

Earlier this week, the Senate Committee on Commerce, Science, and Transportation again examined STB issues during the hearing to renominate Dan Elliott to the Surface Transportation Board. As you may know, the STB has been operating with only two of its three board positions filled. Returning Elliott to the STB will bring the Board back up to full strength and help put it in a better position to address ongoing rate and service issues.

There were many positive statements during the hearing that underscored Chairman Thune's

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commitment to STB reform and made it clear that Dan Elliott understands the serious issues facing the Board. Here are some excerpts and links to the opening statements:

Chairman Thune

"Mr. Elliott previously joined the STB as its chairman in 2009. During his tenure, he worked on important policy questions concerning competitive access, class exemptions from regulation, revenue adequacy and rate regulation. These are complex and interrelated issues that this Committee and various stakeholders believe that the board must confront more effectively. That is why I have worked with Ranking Member Nelson to pass a bill out of this Committee that would reform the STB, known as the STB Reauthorization Act of 2015 (S. 808)."

Dan Elliott

"Many of the agency's longstanding policies were adopted decades ago when the rail industry was struggling to stay alive. Now that the industry is both financially healthier and restructured with far fewer large railroads, I believe the Board should continue the process I started to examine its core policies to ensure that they fit today's modern rail industry and meet the goals that Congress laid out for the agency. Throughout this inquiry, the Board must fulfill the mandate we received from Congress - balancing the 15 Rail Transportation Policy factors in the Interstate Commerce Act in a manner that serves the public.

"To this end, over the last 5 years, I led the Board to an ongoing review of competitive access, rate regulation, revenue adequacy, commodity exemptions and other core policies.

"…. This is the time to consider new ideas and invite our stakeholders to participate in that process so that the Board has an effective regulatory process that makes sense today."

Several other Senators pressed Elliott on the need for reform, and he agreed that the STB's processes are not fair and are cumbersome. Judging from the comments throughout the hearing, we have clearly reached another milestone on the way to STB reform and our advocacy is having an

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impact on moving things forward.

You can get more information and view an archived webcast of the hearing here: http://www.commerce.senate.gov/public/index.cfm?p=Hearings&ContentRecord_id=27653948-36bf-4d2d-965d-c06969d4ba87

House Transportation and Infrastructure Committee

As mentioned earlier this week, the Subcommittee on Railroads, Pipelines, and Hazardous Materials will hold a hearing next Wednesday entitled "The 35th Anniversary of the Staggers Rail Act: Railroad Deregulation Past, Present, and Future." Coalition members have been meeting with members of the House Transportation and Infrastructure Committee to help them understand the growing rate and service issues our members are facing and what changes we think are needed to make the STB run more efficiently. I want to thank everyone who is has been able to participate in the meetings so far and to encourage folks to keep the outreach going leading up to the hearing. This hearing is a good chance for us to make our case and generate support in the House for the reasonable reforms we are proposing.

Updates to the Coalition Website

We have added an updated list of members of the Rail Customer Coalition to the "about us" section of the website. If your organization is not listed and you want to be added, please let me know. We also added several new posts to the "news" section, including an overview of the Senate bill, a summary of the latest research on freight rail rates, and examination of the revenue adequacy issue. We also welcome any ideas and offers to author future posts.

FreightRailReform.com

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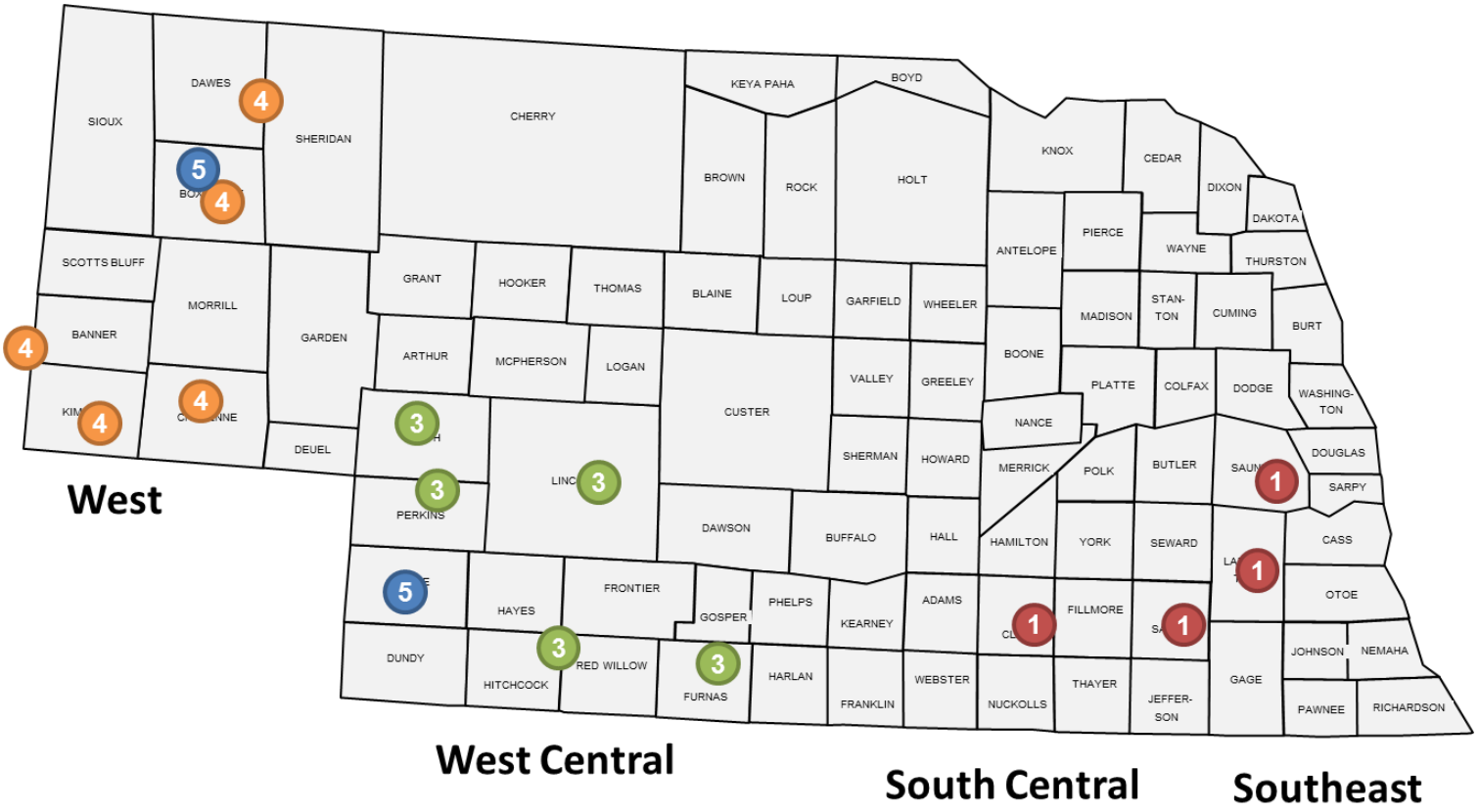
WINTER WHEAT VARIETY TRIALS

- 2015 -

AGRONOMY AND HORTICULTURE

WINTER WHEAT VARIETY TRIAL LOCATIONS



See the Google map of the State Variety Trials: CLICK HERE

or visit: http://bit.ly/wheat15

Test #	County
1511	Saline (1)
1512	Saunders (1)
1513	Lancaster (1)
1521	Clay (2)
1531	Keith (3)
1532	Furnas (3)
1533	Red Willow (3)
1534	Lincoln (3)
1535	Perkins (3)

Test #	County
1541	Cheyenne (4)
1542	Deuel (4)
1543	State Line (4)
1544	Dawes (4)
1545	Box Butte (4)
1551	Box Butte Irrigated (5)
1553	Chase Irrigated (5)

2015 LOCATION SUMMARY TABLE

Test	County	Region	Entries	Researcher	Plant Date	Directions
1511	Saline	Southeast	35	Teshome Regassa	10/16/2014	From Crete, follow HWY 103 S 4.1 miles, right on J Road and travel 0.8 miles. Field on north side of the road. From Wilber, follow HWY 103 N 6 miles, left on J Road and travel 0.8 miles. Field on north side of the road
1512	Saunders	Southeast	35	Teshome Regassa	9/26/2014	East of Agronomy facilities 1/4 mile on H Road, south side of road.
1513	Lancaster	Southeast	35	Teshome Regassa	10/17/2014	UNL Agronomy farm at 84th and Havelock in Lincoln. 2nd field west of main building south side of Havelock
1521	Clay	Southeast	35	Stephen Baenziger	9/18/2014	
1531	Keith	West Central	52	Greg Kruger	9/23/2014	From Brule: 4 miles west on US Hwy 30 to Rd L, 2 north to Rd 90, 1 west to Rd M, 3 north to Rd 120, 0.5 west, 0.4 south; From Big Springs: North on Hwy 138 to Hwy 30, 2 miles east to Rd P, 5 north to Rd 120, 3 east
1532	Furnas	West Central	52	Greg Kruger	9/18/2014	11.5 miles South of Arapahoe on US 283, on west side
1533	Hitchcock	West Central	52	Greg Kruger	10/6/2014	3 miles east of Trenton on Hwy 6 to Massacre Canyon Monument to Road 367, 0.1 south, 0.8 east, on south side
1534	Lincoln	West Central	52	Greg Kruger	9/24/2014	
1535	Perkins	West Central	52	Greg Kruger	9/16/2014	2 miles east of Hwy 23/61 junction in Grant on Hwy 23, 0.3 miles north on Road 330, on the west side.
1541	Cheyenne	West Dryland	60	Dipak Santra	9/10/2014	HPAL Field 26
1542	Kimball	West Dryland	60	Dipak Santra	9/10/2014	From Dix, Ne: Go south on County Rd. 59 for 6 miles. Plot is on the east side of road.
1543	State Line/ Goshen, WY	West Dryland	60	Dipak Santra	9/13/2014	From Lyman, NE: south on county Rd. 2 for 2 miles. Turn west .5 miles on county Rd. J. Go south on Country Rd. 1 for 7 miles. Go west on county Rd. 32 for .5 miles. Plot is on the south side of the road.
1544	Dawes	West Dryland	60	Dipak Santra	9/17/2014	From Chadron: Go 3.5 miles east on Hwy 20. Turn south on Pineview Rd. 25 miles. Turn west onto trial Rd. Plot is on the right side of the trial Rd.
1545	Box Butte	West Dryland	60	Stephen Baenziger	9/9/2014	
1551	Box Butte Irrigated	West Irrigated	52	Dipak Santra	9/26/2014	
1553	Chase Irrigated	West Irrigated	52	Greg Kruger	9/26/2014	From Junction of Hwy 6 and Hwy 61 in Imperial, 5 miles east on Hwy 6, 2 miles east on old Hwy 6, 0.3 miles south; on west side of road,

SALINE RAINFED

1511

Cooperator: Steve Wiese; Wilber, NE
Coordinates: 40.567326, -96.97848

Planted: 10/16/2014

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
2	xx	**101** Scout 66	**113** NE09517	**125** SY Southwind	**201** Overland Gau	**213** LCS Mint	**225** Wesley	**301** "1863"	**313** Scout 66	**325** WB-Cedar	**401** Seed treat 5	**413** NI10718W	**425** Overland Ever & Gau	**501** LCH11-1117	**513** NE10478	**525** NE09521	xx
3	xx	**102** Turkey	**114** NE09521	**126** SY Wolf	**202** "1863"	**214** Camelot	**226** Scout 66	**302** LCS Mint	**314** SY Southwind	**326** KanMark	**402** NE10683	**414** Overland	**426** LCS Mint	**502** LCH13NEDH-5-59	**514** Wesley	**526** Scout 66	xx
4	xx	**103** Wesley	**115** NE10589	**127** WB-Redhawk	**203** NE09517	**215** SY Southwind	**227** Freeman	**303** SY Wolf	**315** Wesley	**327** Seed treat 5	**403** NX04Y2107W	**415** NE10478	**427** Wesley	**503** SY Southwind	**515** SY Wolf	**527** NI10718W	xx
5	xx	**104** Overland	**116** NE10478	**128** WB-Cedar	**204** NE09521	**216** NE10507	**228** Overland Ever & Gau	**304** NE10478	**316** NX04Y2107W	**328** WB-Redhawk	**404** T158	**416** SY Southwind	**428** NE10589	**504** NX04Y2107W	**516** LCH10-13	**528** NE10507	xx
6	xx	**105** Overland Ever	**117** NX04Y2107W	**129** Seed treat 5	**205** Overland Ever	**217** WB-Cedar	**229** LCH13NEDH-5-59	**305** Overland Ever	**317** LCH10-13	**329** NE10507	**405** SY Wolf	**417** NW07505 (W)	**429** Mattern	**505** Camelot	**517** McGill	**529** LCH13NEDH-3-31	xx
7	xx	**106** Overland Gau	**118** NI10718W	**130** "1863"	**206** T158	**218** NE10683	**230** NW07505 (W)	**306** Overland	**318** LCH11-1117	**330** Overland Gau	**406** Camelot	**418** Freeman	**430** LCH13NEDH-5-59	**506** Overland Ever & Gau	**518** WB-Cedar	**530** Turkey	xx
8	xx	**107** Overland Ever & Gau	**119** NX11MD2337	**131** Everest	**207** NI10718W	**219** Mattern	**231** Seed treat 5	**307** NX11MD2337	**319** NE09521	**331** Overland Ever & Gau	**407** LCH13NEDH-3-31	**419** Everest	**431** LCH11-1117	**507** Everest	**519** NE09517	**531** "1863"	xx
9	xx	**108** McGill	**120** NE10683	**132** KanMark	**208** SY Wolf	**220** Everest	**232** NX11MD2337	**308** Camelot	**320** T158	**332** Mattern	**408** Overland Gau	**420** Turkey	**432** LCH10-13	**508** Overland Gau	**520** KanMark	**532** Seed treat 5	xx
10	xx	**109** Camelot	**121** NE10507	**133** LCH13NEDH-5-59	**209** NE10478	**221** Turkey	**233** NX04Y2107W	**309** NE09517	**321** McGill	**333** NW07505 (W)	**409** "1863"	**421** Scout 66	**433** NE10507	**509** NE10683	**521** NX11MD2337	**533** LCS Mint	xx
11	xx	**110** Mattern	**122** LCH10-13	**134** LCH13NEDH-3-31	**210** LCH10-13	**222** WB-Redhawk	**234** NE10589	**310** NE10683	**322** Turkey	**334** Everest	**410** McGill	**422** Overland Ever	**434** NE09517	**510** WB-Redhawk	**522** Overland	**534** T158	xx
12	xx	**111** Freeman	**123** LCS Mint	**135** LCH11-1117	**211** LCH11-1117	**223** McGill	**235** Overland	**311** Freeman	**323** NE10589	**335** LCH13NEDH-3-31	**411** NE09521	**423** KanMark	**435** WB-Redhawk	**511** NW07505 (W)	**523** Mattern	**535** NE10589	xx
13	xx	**112** NW07505 (W)	**124** T158	**Fill**	**212** LCH13NEDH-3-31	**224** KanMark	**Fill**	**312** NI10718W	**324** LCH13NEDH-5-59	**Fill**	**412** WB-Cedar	**424** NX11MD2337	**Fill**	**512** Freeman	**524** Overland Ever	**Fill**	xx
14	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx

SAUNDERS RAINFED

1512

Cooperator: UNL ARDC; Ithica, NE
Coordinates: 41.161033, -96.409526 **Planted:** 9/26/2014

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
17	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
16	XX	525 NE09521	526 Scout 66	527 NI10718W	528 NE10507	529 LCH13NEDH-3-31	530 Turkey	531 "1863"	532 Seed treat 5	533 LCS Mint	534 T158	535 NE10589	Fill	XX
15	XX	513 NE10478	514 Wesley	515 SY Wolf	516 LCH10-13	517 McGill	518 WB-Cedar	519 NE09517	520 KanMark	521 NX11MD2337	522 Overland	523 Mattern	524 Overland Ever	XX
14	XX	501 LCH11-1117	502 LCH13NEDH-5-59	503 SY Southwind	504 NX04Y2107W	505 Camelot	506 Overland Ever & Gau	507 Everest	508 Overland Gau	509 NE10683	510 WB-Redhawk	511 NW07505 (W)	512 Freeman	XX
13	XX	425 Overland Ever & Gau	426 LCS Mint	427 Wesley	428 NE10589	429 Mattern	430 LCH13NEDH-5-59	431 LCH11-1117	432 LCH10-13	433 NE10507	434 NE09517	435 WB-Redhawk	Fill	XX
12	XX	413 NI10718W	414 Overland	415 NE10478	416 SY Southwind	417 NW07505 (W)	418 Freeman	419 Everest	420 Turkey	421 Scout 66	422 Overland Ever	423 KanMark	424 NX11MD2337	XX
11	XX	401 Seed treat 5	402 NE10683	403 NX04Y2107W	404 T158	405 SY Wolf	406 Camelot	407 LCH13NEDH-3-31	408 Overland Gau	409 "1863"	410 McGill	411 NE09521	412 WB-Cedar	XX
10	XX	325 WB-Cedar	326 KanMark	327 Seed treat 5	328 WB-Redhawk	329 NE10507	330 Overland Gau	331 Overland Ever & Gau	332 Mattern	333 NW07505 (W)	334 Everest	335 LCH13NEDH-3-31	Fill	XX
9	XX	313 Scout 66	314 SY Southwind	315 Wesley	316 NX04Y2107W	317 LCH10-13	318 LCH11-1117	319 NE09521	320 T158	321 McGill	322 Turkey	323 NE10589	324 LCH13NEDH-5-59	XX
8	XX	301 "1863"	302 LCS Mint	303 SY Wolf	304 NE10478	305 Overland Ever	306 Overland	307 NX11MD2337	308 Camelot	309 NE09517	310 NE10683	311 Freeman	312 NI10718W	XX
7	XX	225 Wesley	226 Scout 66	227 Freeman	228 Overland Ever & Gau	229 LCH13NEDH-5-59	230 NW07505 (W)	231 Seed treat 5	232 NX11MD2337	233 NX04Y2107W	234 NE10589	235 Overland	Fill	XX
6	XX	213 LCS Mint	214 Camelot	215 SY Southwind	216 NE10507	217 WB-Cedar	218 NE10683	219 Mattern	220 Everest	221 Turkey	222 WB-Redhawk	223 McGill	224 KanMark	XX
5	XX	201 Overland Gau	202 "1863"	203 NE09517	204 NE09521	205 Overland Ever	206 T158	207 NI10718W	208 SY Wolf	209 NE10478	210 LCH10-13	211 LCH11-1117	212 LCH13NEDH-3-31	XX
4	XX	125 SY Southwind	126 SY Wolf	127 WB-Redhawk	128 WB-Cedar	129 Seed treat 5	130 "1863"	131 Everest	132 KanMark	133 LCH13NEDH-5-59	134 LCH13NEDH-3-31	135 LCH11-1117	Fill	XX
3	XX	113 NE09517	114 NE09521	115 NE10589	116 NE10478	117 NX04Y2107W	118 NI10718W	119 NX11MD2337	120 NE10683	121 NE10507	122 LCH10-13	123 LCS Mint	124 T158	XX
2	XX	101 Scout 66	102 Turkey	103 Wesley	104 Overland	105 Overland Ever	106 Overland Gau	107 Overland Ever & Gau	108 McGill	109 Camelot	110 Mattern	111 Freeman	112 NW07505 (W)	XX
1	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

N

LANCASTER RAINFED

1513

Cooperator: UNL Agronomy Farm; Lincoln, NE
Coordinates: 40.856386, -96.609952 Planted: 10/27/2014

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
xx	**101** Scout 66	**113** NE09517	**125** SY Southwind	**201** NE10683	**213** NE09517	**225** T158	**301** NX11MD2337	**313** NE10507	**325** LCH11-1117	**401** SY Southwind	**413** NE10683	**425** Seed treat 5	**501** LCH11-1117	**513** Everest	**525** NX11MD2337	xx
xx	**102** Turkey	**114** NE09521	**126** SY Wolf	**202** LCH11-1117	**214** LCH13NEDH-5-59	**226** Overland Ever	**302** Wesley	**314** NX04Y2107W	**326** Mattern	**402** Wesley	**414** LCH13NEDH-3-31	**426** LCH13NEDH-5-59	**502** NE10683	**514** McGill	**526** SY Wolf	xx
xx	**103** Wesley	**115** NE10589	**127** WB-Redhawk	**203** LCH10-13	**215** WB-Redhawk	**227** NE10589	**303** LCH10-13	**315** NW07505 (W)	**327** Camelot	**403** Mattern	**415** LCS Mint	**427** T158	**503** Scout 66	**515** Overland	**527** LCH10-13	xx
xx	**104** Overland	**116** NE10478	**128** WB-Cedar	**204** Everest	**216** SY Southwind	**228** NX11MD2337	**304** Overland	**316** Overland Ever	**328** WB-Redhawk	**404** NE10478	**416** Scout 66	**428** NX04Y2107W	**504** Overland Gau	**516** NI10718W	**528** NW07505 (W)	xx
xx	**105** Overland Ever	**117** NX04Y2107W	**129** Seed treat 5	**205** NE09521	**217** Scout 66	**229** Mattern	**305** Seed treat 5	**317** Freeman	**329** Turkey	**405** Overland Ever & Gau	**417** NE10589	**429** Everest	**505** SY Southwind	**517** LCS Mint	**529** "1863"	xx
xx	**106** Overland Gau	**118** NI10718W	**130** "1863"	**206** Overland Ever & Gau	**218** LCH13NEDH-3-31	**230** LCS Mint	**306** LCH13NEDH-3-31	**318** NE10589	**330** LCH13NEDH-5-59	**406** NI10718W	**418** "1863"	**430** LCH11-1117	**506** NE10589	**518** NX04Y2107W	**530** NE09517	xx
xx	**107** Overland Ever & Gau	**119** NX11MD2337	**131** Everest	**207** NW07505 (W)	**219** NE10507	**231** McGill	**307** NE10683	**319** "1863"	**331** NE09521	**407** Overland Gau	**419** KanMark	**431** NW07505 (W)	**507** Freeman	**519** T158	**531** LCH13NEDH-3-31	xx
xx	**108** McGill	**120** NE10683	**132** KanMark	**208** Seed treat 5	**220** SY Wolf	**232** NX04Y2107W	**308** NE09517	**320** Overland Gau	**332** Everest	**408** Turkey	**420** NE09521	**432** NX11MD2337	**508** Mattern	**520** WB-Cedar	**532** Wesley	xx
xx	**109** Camelot	**121** NE10507	**133** LCH13NEDH-5-59	**209** Overland	**221** NE10478	**233** WB-Cedar	**309** SY Southwind	**321** KanMark	**333** NI10718W	**409** Overland	**421** NE09517	**433** LCH10-13	**509** NE10507	**521** Camelot	**533** Overland Ever	xx
xx	**110** Mattern	**122** LCH10-13	**134** LCH13NEDH-3-31	**210** Freeman	**222** KanMark	**234** Turkey	**310** NE10478	**322** T158	**334** McGill	**410** Freeman	**422** WB-Redhawk	**434** WB-Cedar	**510** LCH13NEDH-5-59	**522** Seed treat 5	**534** Overland Ever & Gau	xx
xx	**111** Freeman	**123** LCS Mint	**135** LCH11-1117	**211** "1863"	**223** Camelot	**235** Wesley	**311** WB-Cedar	**323** LCS Mint	**335** Scout 66	**411** SY Wolf	**423** McGill	**435** Overland Ever	**511** NE09521	**523** KanMark	**535** WB-Redhawk	xx
xx	**112** NW07505 (W)	**124** T158	**Fill**	**212** Overland Gau	**224** NI10718W	**Fill**	**312** SY Wolf	**324** Overland Ever & Gau	**Fill**	**412** Camelot	**424** NE10507	**Fill**	**512** Turkey	**524** NE10478	**Fill**	xx
xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
15-29	Seed Rate Trial															
30-44	Seed Treatment Trial															

N

CLAY RAINFED
1521

Cooperator: UNL South Central Research & Ext Center; Harvard, NE
Coordinates: 40.57693, -98.13400 **Planted:** 9/18/2014

	Row	Row	1-40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	
8-24																					8-24
7	F	F		**226** Overland Ever	**227** LCH10-13	**228** WB-Grainfield	**229** Turkey	**230** NE10507	**231** Overland Gau	**232** NI10718W	**233** T158	**234** Fill	**235** Fill	**331** Scout 66	**332** LCS Wizard	**333** Overland	**334** Fill	**335** Fill	F	F	7
6	F	F		**216** Scout 66	**217** NE09521	**218** NE10589	**219** NX04Y2107W	**220** WB4458	**221** LCH13NEDH-3-31	**222** WB-Cedar	**223** Overland Ever & Gau	**224** Freeman	**225** KanMark	**326** NE10683	**327** LCH13NEDH-3-31	**328** NE07531	**329** "1863"	**330** Overland Ever	F	F	6
5	F	F		**206** NE10478	**207** NE10683	**208** NE07531	**209** NX11MD2337	**210** Everest	**211** "1863"	**212** LCS Mint	**213** Mattern	**214** LCH13NEDH-5-59	**215** NE09517	**321** Freeman	**322** NE10507	**323** KanMark	**324** Mattern	**325** LCS Mint	F	F	5
4	F	F		**131** LCS Mint	**132** LCS Wizard	**133** NX04Y2107W	**134** Fill	**135** Fill	**201** NW07505 (W)	**202** Wesley	**203** LCS Wizard	**204** WB-Redhawk	**205** Overland	**316** LCH10-13	**317** T158	**318** WB-Redhawk	**319** Overland Ever & Gau	**320** NW07505 (W)	F	F	4
3	F	F		**121** Turkey	**122** NE10683	**123** WB4458	**124** Freeman	**125** LCH10-13	**126** NE10478	**127** WB-Redhawk	**128** KanMark	**129** NE07531	**130** NW07505 (W)	**311** Turkey	**312** NI10718W	**313** NE10589	**314** WB4458	**315** Everest	F	F	3
2	F	F		**111** NE09521	**112** LCH13NEDH-5-59	**113** Mattern	**114** Overland Ever	**115** NE10507	**116** Overland Ever & Gau	**117** Wesley	**118** Overland	**119** Everest	**120** WB-Cedar	**306** NE09517	**307** LCH13NEDH-5-59	**308** WB-Cedar	**309** NE10478	**310** WB-Grainfield	F	F	2
1	F	F		**101** WB-Grainfield	**102** NE10589	**103** NE09517	**104** "1863"	**105** Scout 66	**106** Overland Gau	**107** NI10718W	**108** LCH13NEDH-3-31	**109** NX11MD2337	**110** T158	**301** NE09521	**302** Overland Gau	**303** NX11MD2337	**304** Wesley	**305** NX04Y2107W	F	F	1

KEITH RAINFED

1531

Cooperator: UNL Water Resource Field Lab; Brule, NE
Coordinates: 41.163207, -101.979973 Planted: 9/23/2014

101 Scout 66	**201** LCH13NEDH-5-59	**301** NE09521	**401** Judee	**501** WB Winterhawk	**601** Bearpaw
102 Turkey	**202** NE10478	**302** Antero	**402** NE10478	**502** Overland Ever	**602** KanMark
103 Wesley	**203** SY Wolf	**303** Overland Gau	**403** Byrd	**503** Warhorse	**603** SY Wolf
104 Overland	**204** Mattern	**304** NE10589	**404** Wesley	**504** WB-Grainfield	**604** 06BC796#68
105 Overland Ever	**205** Bearpaw	**305** NI10718W	**405** "1863"	**505** Scout 66	**605** Monument
106 Overland Gau	**206** "1863"	**306** NX11MD2337	**406** Bearpaw	**506** WB4458	**606** NW07505 (W)
107 Overland E & G	**207** NI10718W	**307** Settler CL	**407** N11MD2166W	**507** NE10683	**607** Warhorse
108 McGill	**208** Scout 66	**308** WB-Grainfield	**408** Mace	**508** NE09517	**608** NX04Y2107W
109 Settler CL	**209** Hatcher	**309** LCI13NEDH-14-53W	**409** NE10683	**509** Freeman	**609** LCH13NEDH-5-59
110 Mattern	**210** Turkey	**310** Scout 66	**410** Overland E & G	**510** NX04Y2107W	**610** LCH13NEDH-3-31
111 Freeman	**211** Overland E & G	**311** Judee	**411** T158	**511** NE10589	**611** Overland E & G
112 NW07505 (W)	**212** NX11MD2337	**312** Warhorse	**412** KanMark	**512** Overland	**612** NW03666 (W)
113 NE09517	**213** CO11D174	**313** KanMark	**413** Turkey	**513** Byrd	**613** Brawl Cl Plus
114 NE09521	**214** Antero	**314** Overland E & G	**414** WB Winterhawk	**514** KanMark	**614** NX11MD2337
115 NE10589	**215** Mace	**315** NE10507	**415** NI10718W	**515** Brawl Cl Plus	**615** Overland Ever
116 NE10478	**216** Overland	**316** McGill	**416** CO11D174	**516** Judee	**616** Mint
117 NX04Y2107W	**217** LCI13NEDH-14-53W	**317** Brawl Cl Plus	**417** Warhorse	**517** LCI13NEDH-14-53W	**617** Mattern
118 Robidoux	**218** NW07505 (W)	**318** Mace	**418** NX04Y2107W	**518** NE10507	**618** NE10478
119 NI10718W	**219** T158	**319** LCH13NEDH-3-31	**419** NX11MD2337	**519** Wizard	**619** Mace
120 NX11MD2337	**220** Freeman	**320** NE09517	**420** Overland Ever	**520** NI10718W	**620** Freeman
121 N11MD2166W	**221** Wizard	**321** Denali	**421** LCH13NEDH-5-59	**521** Mace	**621** Byrd
122 NW03666 (W)	**222** Monument	**322** 06BC796#68	**422** Overland	**522** Denali	**622** Turkey
123 NE10683	**223** Brawl Cl Plus	**323** 06BC722#25	**423** Antero	**523** N11MD2130W	**623** Infinity CL
124 Warhorse	**224** NE10589	**324** WB4458	**424** SY Wolf	**524** Settler CL	**624** CO11D174
125 Judee	**225** NE09517	**325** CO11D174	**425** Scout 66	**525** 06BC796#68	**625** T158
126 Bearpaw	**226** WB4458	**326** Overland Ever	**426** Mint	**526** "1863"	**626** WB4458
127 NE10507	**227** NW03666 (W)	**327** LCH13NEDH-5-59	**427** Mattern	**527** Monument	**627** NE10683
128 Infinity CL	**228** NX04Y2107W	**328** Wesley	**428** NE10507	**528** Hatcher	**628** N11MD2166W
129 Mace	**229** N11MD2166W	**329** NE10683	**429** Infinity CL	**529** NE09521	**629** NE10507
130 LCH10-13	**230** NE09521	**330** N11MD2166W	**430** NW03666 (W)	**530** Bearpaw	**630** N11MD2130W
131 Mint	**231** 06BC722#25	**331** Bearpaw	**431** 06BC722#25	**531** N11MD2166W	**631** NE10589
632 NE09521	**532 Mint**	**432 Robidoux**	**332 LCH10-13**	**232 Wesley**	**132 T158**
133 Wizard	**233** Overland Ever	**333** NW07505 (W)	**433** NW07505 (W)	**533** Wesley	**633** Denali
134 SY Wolf	**234** Byrd	**334** SY Wolf	**434** Denali	**534** LCH13NEDH-5-59	**634** Scout 66
135 Monument	**235** Judee	**335** Turkey	**435** Hatcher	**535** Turkey	**635** Overland
136 WB Winterhawk	**236** NE10507	**336** Mattern	**436** WB4458	**536** LCH13NEDH-3-31	**636** Judee
137 WB4458	**237** Mint	**337** Overland	**437** NE10589	**537** Robidoux	**637** Antero
138 WB-Grainfield	**238** Settler CL	**338** NE10478	**438** LCH10-13	**538** Antero	**638** Robidoux
139 Brawl Cl Plus	**239** NE10683	**339** Infinity CL	**439** Wizard	**639 LCI13NEDH-14-53W**	**539 T158**
140 Hatcher	**240** Robidoux	**340** Mint	**440** Freeman	**540** 06BC722#25	**640** McGill
141 Byrd	**241** McGill	**341** Robidoux	**441** N11MD2130W	**541** Mattern	**641** WB-Grainfield

FURNAS RAINFED

1532

101	Scout 66	114	NE09521	127	NE10507	140	PG Hatcher	201	HG Settler CL	214	Mattern	227	WB-Grainfield	240	HG Overland Ever	301	WG "1863"	314	NE10589	327	HG Settler CL	340	Freeman
102	Turkey	115	NE10589	128	Infinity CL	141	PG Byrd	202	NW03666 (W)	215	Bearpaw	228	Syn Monument	241	Judee	302	Wesley	315	SYN 06BC722#25	328	Turkey	341	LCS LCH13NEDH-3-31
103	Wesley	116	NE10478	129	Mace	142	PG Denali	203	NE10589	216	WB Winterhawk	229	LCS Mint	242	PG Hatcher	303	NX11MD2337	316	HG Overland	329	NE10478	342	PG Hatcher
104	HG Overland	117	NX04Y2107W	130	LCS LCH10-13	143	PG Antero	204	LCS LCH13NEDH-3-31	217	NX11MD2337	230	CO11D174	243	LCS LCI13NEDH-14-53W	304	HG Overland Gau	317	CO11D174	330	NE10683	343	NE09517
105	HG Overland Ever	118	HG Robidoux	131	LCS Mint	144	WG "1863"	205	Turkey	218	WG KanMark	231	NE09517	244	PG Brawl CI Plus	305	LCS N11MD2130W	318	HG Overland Ever	331	Bearpaw	344	NI10718W
106	HG Overland Gau	119	NI10718W	132	LCS T158	145	WG KanMark	206	N11MD2166W	219	NE09521	232	LCS LCH13NEDH-5-59	245	HG Overland	306	LCS LCH13NEDH-5-59	319	SY Wolf	332	SYN 06BC796#68	345	WB Winterhawk
107	HG Overland Ever & Gau	120	NX11MD2337	133	LCS Wizard	146	CO11D174	207	LCS LCH10-13	220	HG McGill	233	NE10478	246	NX04Y2107W	307	LCS LCH10-13	320	HG McGill	333	NX04Y2107W	346	Infinity CL
108	HG McGill	121	N11MD2166W	134	SY Wolf	147	LCS LCH13NEDH-5-59	208	Scout 66	221	NI10718W	234	WB4458	247	LCS N11MD2130W	308	NW07505 (W)	321	LCS Wizard	334	Syn Monument	347	PG Denali
109	HG Settler CL	122	NW03666 (W)	135	Syn Monument	148	LCS LCH13NEDH-3-31	209	NE10683	222	HG Overland Gau	235	Freeman	248	SYN 06BC796#68	309	Mace	322	NE09521	335	HG Robidoux	348	WG KanMark
110	Mattern	123	NE10683	136	WB Winterhawk	149	LCS N11MD2130W	210	SYN 06BC722#25	223	SY Wolf	236	NW07505 (W)	249	NE10507	310	WB4458	323	N11MD2166W	336	LCS Mint	349	Judee
111	Freeman	124	Warhorse	137	WB4458	150	SYN 06BC722#25	211	LCS T158	224	Infinity CL	237	LCS Wizard	250	Wesley	311	Warhorse	324	LCS LCI13NEDH-14-53W	337	HG Overland Ever & Gau	350	NW03666 (W)
112	NW07505 (W)	125	Judee	138	WB-Grainfield	151	SYN 06BC796#68	212	HG Robidoux	225	Warhorse	238	WG "1863"	251	PG Byrd	312	PG Byrd	325	LCS T158	338	Mattern	351	Scout 66
113	NE09517	126	Bearpaw	139	PG Brawl CI Plus	152	LCS LCI13NEDH-14-53W	213	Mace	226	PG Antero	239	PG Denali	252	HG Overland Ever & Gau	313	PG Brawl CI Plus	326	PG Antero	339	WB-Grainfield	352	NE10507

Terrace

401	NW03666 (W)	414	PG Antero	427	NX11MD2337	440	HG Overland Gau	501	LCS Mint	514	NX11MD2337	527	LCS T158	540	NE10507	601	HG Overland Gau	614	PG Byrd	627	LCS T158	640	LCS N11MD2130W
402	Bearpaw	415	LCS Wizard	428	LCS LCH10-13	441	WB Winterhawk	502	HG Overland Ever & Gau	515	PG Brawl CI Plus	528	Syn Monument	541	CO11D174	602	WG KanMark	615	SYN 06BC722#25	628	Freeman	641	Judee
403	Freeman	416	SY Wolf	429	HG Overland Ever	442	CO11D174	503	WB4458	516	LCS Wizard	529	Mattern	542	HG Overland Gau	603	Warhorse	616	HG Overland	629	HG Settler CL	642	WB-Grainfield
404	HG Overland	417	LCS Mint	430	NE09517	443	NE10589	504	Infinity CL	517	WG "1863"	530	LCS LCI13NEDH-14-53W	543	HG Settler CL	604	LCS LCH13NEDH-3-31	617	LCS Mint	630	NE09521	643	PG Brawl CI Plus
405	PG Denali	418	HG Settler CL	431	NE10507	444	NE09521	505	NE09517	518	WB Winterhawk	531	WB-Grainfield	544	LCS LCH13NEDH-5-59	605	NE10683	618	CO11D174	631	SYN 06BC796#68	644	WG "1863"
406	SYN 06BC722#25	419	Syn Monument	432	HG Overland Ever & Gau	445	Mace	506	Mace	519	LCS LCH10-13	532	Judee	545	NX04Y2107W	606	Mace	619	LCS LCH13NEDH-5-59	632	NX11MD2337	645	Bearpaw
407	Mattern	420	SYN 06BC796#68	433	LCS N11MD2130W	446	NI10718W	507	NI10718W	520	LCS LCH13NEDH-3-31	533	NW03666 (W)	546	NE09521	607	PG Antero	620	NE09517	633	NI10718W	646	LCS LCI13NEDH-14-53W
408	WG "1863"	421	Scout 66	434	PG Byrd	447	NE10683	508	Wesley	521	PG Hatcher	534	SYN 06BC722#25	547	PG Denali	608	PG Denali	621	HG Robidoux	634	WB Winterhawk	647	Syn Monument
409	Wesley	422	LCS LCH13NEDH-5-59	435	N11MD2166W	448	HG Robidoux	509	SYN 06BC796#68	522	NW07505 (W)	535	N11MD2166W	548	WG KanMark	609	NW03666 (W)	622	HG McGill	635	Infinity CL	648	NE10478
410	NE10478	423	Infinity CL	436	Warhorse	449	NW07505 (W)	510	LCS N11MD2130W	523	SY Wolf	536	Bearpaw	549	HG Overland Ever	610	Wesley	623	HG Overland Ever	636	LCS LCH10-13	649	Turkey
411	NX04Y2107W	424	LCS T158	437	HG McGill	450	PG Hatcher	511	Turkey	524	HG McGill	537	HG Robidoux	550	NE10589	611	NW07505 (W)	624	NE10507	637	LCS Wizard	650	HG Overland Ever & Gau
412	PG Brawl CI Plus	425	LCS LCI13NEDH-14-53W	438	Turkey	451	Judee	512	HG Overland	525	NE10683	538	Warhorse	551	Scout 66	612	NX04Y2107W	625	WB4458	638	SY Wolf	651	NE10589
413	LCS LCH13NEDH-3-31	426	WB-Grainfield	439	WG KanMark	452	WB4458	513	PG Antero	526	NE10478	539	Freeman	552	PG Byrd	613	N11MD2166W	626	Scout 66	639	Mattern	652	PG Hatcher

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Cooperator: Rex McClain; Arapahoe, NE
Coordinates: 40.137574, -99.894844

Planted: 9/18/2014

HITCHCOCK RAINFED

1533

Cooperator: Cappel Farms; McCook, NE
Coordinates: 40.204629, -100.951631

Planted: 10/6/2014

101 Scout 66	201 SY Wolf	301 NX11MD2337	401 Mattern	501 SY Wolf	601 PG Brawl Cl Plus
102 Turkey	202 PG Denali	302 LCS LCI13NEDH-14-53W	402 NW03666 (W)	502 NW03666 (W)	602 NI10718W
103 Wesley	203 LCS LCH10-13	303 Warhorse	403 NE10507	503 LCS LCH13NEDH-3-31	603 HG Robidoux
104 HG Overland	204 Mace	304 NE10507	404 HG Robidoux	504 PG Byrd	604 LCS Mint
105 HG Overland Ever	205 WB Winterhawk	305 LCS T158	405 NX04Y2107W	505 Warhorse	605 CO11D174
106 HG Overland Gau	206 NE10683	306 NX04Y2107W	406 PG Antero	506 NE10589	606 LCS LCI13NEDH-14-53W
107 HG Overland Ever & Gau	207 Syn Monument	307 WB-Grainfield	407 Warhorse	507 LCS LCH13NEDH-5-59	607 HG Overland Gau
108 HG McGill	208 NX04Y2107W	308 LCS LCH10-13	408 SYN 06BC796#68	508 LCS T158	608 Infinity CL
109 HG Settler CL	209 NE09517	309 Infinity CL	409 Freeman	509 Mattern	609 HG Overland
110 Mattern	210 NE10589	310 SYN 06BC722#25	410 LCS Mint	510 HG Settler CL	610 LCS N11MD2130W
111 Freeman	211 WG KanMark	311 HG Overland Ever	411 HG Settler CL	511 PG Brawl Cl Plus	611 Bearpaw
112 NW07505 (W)	212 N11MD2166W	312 Freeman	412 Turkey	512 PG Denali	612 PG Hatcher
113 NE09517	213 LCS LCH13NEDH-3-31	313 SY Wolf	413 SYN 06BC722#25	513 NE10478	613 Syn Monument
114 NE09521	214 PG Brawl Cl Plus	314 LCS LCH13NEDH-5-59	414 WB Winterhawk	514 Infinity CL	614 PG Antero
115 NE10589	215 PG Antero	315 LCS LCH13NEDH-3-31	415 WB4458	515 WB Winterhawk	615 NE09517
116 NE10478	216 LCS Mint	316 Bearpaw	416 HG Overland Ever	516 Syn Monument	616 NX04Y2107W
117 NX04Y2107W	217 NX11MD2337	317 NE09517	417 PG Byrd	517 Bearpaw	617 NE09521
118 HG Robidoux	218 HG Overland Gau	318 NI10718W	418 Wesley	518 LCS LCI13NEDH-14-53W	618 WG "1863"
119 NI10718W	219 Judee	319 NW03666 (W)	419 HG Overland Ever & Gau	519 Turkey	619 NW03666 (W)
120 NX11MD2337	220 WB-Grainfield	320 Wesley	420 Infinity CL	520 NE10683	620 WB-Grainfield
121 N11MD2166W	221 Warhorse	321 HG Overland	421 PG Denali	521 CO11D174	621 Mattern
122 NW03666 (W)	222 NI10718W	322 HG Overland Gau	422 PG Hatcher	522 HG Overland Ever & Gau	622 NW07505 (W)
123 NE10683	223 Mattern	323 NE10589	423 NE09521	523 WB-Grainfield	623 PG Byrd
124 Warhorse	224 Turkey	324 WB Winterhawk	424 Judee	524 PG Antero	624 LCS T158
125 Judee	225 NW07505 (W)	325 HG Settler CL	425 Syn Monument	525 HG Overland Ever	625 Wesley
126 Bearpaw	226 NE10507	326 NE09521	426 Bearpaw	526 SYN 06BC722#25	626 NE10507
127 NE10507	227 PG Hatcher	327 Scout 66	427 WG KanMark	527 Scout 66	627 LCS Wizard
128 Infinity CL	228 HG McGill	328 SYN 06BC796#68	428 HG Overland	528 HG Overland	628 Freeman
129 Mace	229 CO11D174	329 WB4458	429 CO11D174	529 LCS Mint	629 LCS LCH10-13
130 LCS LCH10-13	230 LCS T158	330 PG Byrd	430 WB-Grainfield	530 PG Hatcher	630 WB Winterhawk
131 LCS Mint	231 SYN 06BC796#68	331 Judee	431 LCS Wizard	531 NW07505 (W)	631 Scout 66
132 LCS T158	232 LCS LCH13NEDH-5-59	332 WG KanMark	432 Scout 66	532 NE09521	632 HG Overland Ever
133 LCS Wizard	233 WB4458	333 Mace	433 HG McGill	533 NX04Y2107W	633 Turkey
134 SY Wolf	234 HG Overland	334 CO11D174	434 LCS LCH13NEDH-3-31	534 NE10507	634 SYN 06BC722#25
135 Syn Monument	235 NW03666 (W)	335 HG McGill	435 NW07505 (W)	535 HG McGill	635 NX11MD2337
136 WB Winterhawk	236 Scout 66	336 PG Hatcher	436 NE10589	536 Wesley	636 HG McGill
137 WB4458	237 HG Overland Ever	337 LCS Wizard	437 WG "1863"	537 Mace	637 HG Settler CL
138 WB-Grainfield	238 Wesley	338 Mattern	438 PG Brawl Cl Plus	538 LCS LCH10-13	638 SYN 06BC796#68
139 PG Brawl Cl Plus	239 LCS Wizard	339 LCS N11MD2130W	439 HG Overland Gau	539 NI10718W	639 NE10683
140 PG Hatcher	240 HG Overland Ever & Gau	340 PG Antero	440 NX11MD2337	540 Freeman	640 LCS LCH13NEDH-5-59
141 PG Byrd	241 LCS N11MD2130W	341 Syn Monument	441 NE10683	541 NE09517	641 SY Wolf
142 PG Denali	242 Freeman	342 N11MD2166W	442 NE09517	542 WG KanMark	642 WG KanMark
143 PG Antero	243 NE09521	343 PG Brawl Cl Plus	443 LCS N11MD2130W	543 WG "1863"	643 LCS LCH13NEDH-3-31
144 WG "1863"	244 SYN 06BC722#25	344 WG "1863"	444 LCS LCH10-13	544 Judee	644 NE10478
145 WG KanMark	245 HG Settler CL	345 NW07505 (W)	445 NE10478	545 HG Robidoux	645 Mace
146 CO11D174	246 PG Byrd	346 PG Denali	446 LCS LCI13NEDH-14-53W	546 SYN 06BC796#68	646 PG Denali
147 LCS LCH13NEDH-5-59	247 Infinity CL	347 NE10478	447 N11MD2166W	547 WB4458	647 WB4458
148 LCS LCH13NEDH-3-31	248 LCS LCI13NEDH-14-53W	348 HG Overland Ever & Gau	448 NI10718W	548 HG Overland Gau	648 NE10589
149 LCS N11MD2130W	249 HG Robidoux	349 LCS Mint	449 LCS T158	549 N11MD2166W	649 HG Overland Ever & Gau
150 SYN 06BC722#25	250 NE10478	350 HG Robidoux	450 Mace	550 NX11MD2337	650 Judee
151 SYN 06BC796#68	251 Bearpaw	351 NE10683	451 SY Wolf	551 LCS N11MD2130W	651 Warhorse
152 LCS LCI13NEDH-14-53W	252 WG "1863"	352 Turkey	452 LCS LCH13NEDH-5-59	552 LCS Wizard	652 N11MD2166W

LINCOLN RAINFED

1534

Cooperator: UNL West Central REC; North Platte, NE
Coordinates: 41.057712, -100.750261 **Planted:** 9/24/2014

101 Scout 66	**127** NE10507	**201** LCS LCI13NEDH-14-53W	**227** NE09521	**301** HG Robidoux	**327** LCS LCH10-13	**401** Judee	**427** Wesley	**501** NW03666 (W)	**527** Warhorse	**601** HG McGill	**627** SYN 06BC796#68
102 Turkey	**128** Infinity CL	**202** SY Wolf	**228** SYN 06BC796#68	**302** Mattern	**328** NW03666 (W)	**402** Syn Monument	**428** NX04Y2107W	**502** LCS T158	**528** LCS LCI13NEDH-14-53W	**602** N11MD2166W	**628** PG Hatcher
103 Wesley	**129** Mace	**203** LCS Wizard	**229** Mace	**303** HG Overland	**329** WB-Grainfield	**403** N11MD2166W	**429** NW03666 (W)	**503** NE10507	**529** NE10683	**603** NE09517	**629** LCS Wizard
104 HG Overland	**130** LCS LCH10-13	**204** NW03666 (W)	**230** WB-Grainfield	**304** NW07505 (W)	**330** PG Hatcher	**404** NE09521	**430** HG Settler CL	**504** LCS N11MD2130W	**530** PG Antero	**604** LCS Mint	**630** LCS T158
105 HG Overland Ever	**131** LCS Mint	**205** HG McGill	**231** NE10478	**305** Infinity CL	**331** HG Overland Ever & Gau	**405** Freeman	**431** NI10718W	**505** HG McGill	**531** Freeman	**605** PG Antero	**631** PG Brawl Cl Plus
106 HG Overland Gau	**132** LCS T158	**206** Infinity CL	**232** PG Antero	**306** HG Overland Ever	**332** N11MD2166W	**406** NE10683	**432** WB-Grainfield	**506** PG Brawl Cl Plus	**532** NE09517	**606** LCS LCH10-13	**632** WG KanMark
107 HG Overland Ever & Gau	**133** LCS Wizard	**207** HG Settler CL	**233** Scout 66	**307** HG Settler CL	**333** NX11MD2337	**407** SYN 06BC722#25	**433** NW07505 (W)	**507** LCS Mint	**533** HG Overland	**607** NE10683	**633** WB4458
108 HG McGill	**134** SY Wolf	**208** NE10683	**234** Turkey	**308** Turkey	**334** NE09517	**408** PG Antero	**434** NX11MD2337	**508** PG Hatcher	**534** NE10589	**608** WB-Grainfield	**634** LCS LCH13NEDH-3-31
109 HG Settler CL	**135** Syn Monument	**209** PG Denali	**235** N11MD2166W	**309** Wesley	**335** Syn Monument	**409** HG Overland	**435** LCS T158	**509** LCS LCH10-13	**535** PG Byrd	**609** NX11MD2337	**635** Warhorse
110 Mattern	**136** WB Winterhawk	**210** Warhorse	**236** HG Robidoux	**310** PG Antero	**336** LCS Wizard	**410** PG Denali	**436** Mace	**510** Scout 66	**536** HG Overland Ever & Gau	**610** HG Settler CL	**636** HG Robidoux
111 Freeman	**137** WB4458	**211** NX04Y2107W	**237** WB4458	**311** PG Brawl Cl Plus	**337** HG McGill	**411** NE09517	**437** PG Hatcher	**511** LCS Wizard	**537** Turkey	**611** Bearpaw	**637** NE10589
112 NW07505 (W)	**138** WB-Grainfield	**212** HG Overland	**238** CO11D174	**312** Freeman	**338** HG Overland Gau	**412** HG McGill	**438** Turkey	**512** N11MD2166W	**538** HG Overland Gau	**612** Syn Monument	**638** NE10478
113 NE09517	**139** PG Brawl Cl Plus	**213** LCS T158	**239** NE09517	**313** WB Winterhawk	**339** Scout 66	**413** LCS LCH13NEDH-5-59	**439** LCS LCI13NEDH-14-53W	**513** WG KanMark	**539** NE10478	**613** Mace	**639** HG Overland Ever
114 NE09521	**140** PG Hatcher	**214** Syn Monument	**240** NE10507	**314** NX04Y2107W	**340** LCS T158	**414** LCS Mint	**440** Warhorse	**514** Judee	**540** WB Winterhawk	**614** NE09521	**640** HG Overland
115 NE10589	**141** PG Byrd	**215** WG KanMark	**241** NW07505 (W)	**315** NI10718W	**341** WB4458	**415** Bearpaw	**441** SY Wolf	**515** Bearpaw	**541** WB4458	**615** LCS N11MD2130W	**641** PG Byrd
116 NE10478	**142** PG Denali	**216** PG Hatcher	**242** WG "1863"	**316** LCS Mint	**342** CO11D174	**416** Mattern	**442** NE10478	**516** Mace	**542** SY Wolf	**616** LCS LCI13NEDH-14-53W	**642** Mattern
117 NX04Y2107W	**143** PG Antero	**217** PG Byrd	**243** LCS N11MD2130W	**317** SY Wolf	**343** NE10507	**417** NE10589	**443** NE10507	**517** HG Settler CL	**543** WG "1863"	**617** NW07505 (W)	**643** CO11D174
118 HG Robidoux	**144** WG "1863"	**218** HG Overland Ever	**244** Mattern	**318** NE10478	**344** Warhorse	**418** HG Robidoux	**444** Infinity CL	**518** LCS LCH13NEDH-5-59	**544** NI10718W	**618** Freeman	**644** Wesley
119 NI10718W	**145** WG KanMark	**219** NI10718W	**245** HG Overland Ever & Gau	**319** PG Byrd	**345** SYN 06BC722#25	**419** WB Winterhawk	**445** WG KanMark	**519** Syn Monument	**545** Mattern	**619** HG Overland Gau	**645** PG Denali
120 NX11MD2337	**146** CO11D174	**220** LCS LCH10-13	**246** Wesley	**320** NE10589	**346** PG Denali	**420** LCS LCH13NEDH-3-31	**446** WB4458	**520** NX11MD2337	**546** LCS LCH13NEDH-3-31	**620** SYN 06BC722#25	**646** LCS LCH13NEDH-5-59
121 N11MD2166W	**147** LCS LCH13NEDH-5-59	**221** LCS LCH13NEDH-5-59	**247** LCS LCH13NEDH-3-31	**321** NE09521	**347** NE10683	**421** PG Byrd	**447** WG "1863"	**521** NE09521	**547** NX04Y2107W	**621** NE10507	**647** NW03666 (W)
122 NW03666 (W)	**148** LCS LCH13NEDH-3-31	**222** HG Overland Gau	**248** Freeman	**322** Bearpaw	**348** WG KanMark	**422** HG Overland Ever	**448** PG Brawl Cl Plus	**522** HG Overland Ever	**548** Infinity CL	**622** WB Winterhawk	**648** HG Overland Ever & Gau
123 NE10683	**149** LCS N11MD2130W	**223** SYN 06BC722#25	**249** Bearpaw	**323** Mace	**349** LCS LCH13NEDH-3-31	**423** SYN 06BC796#68	**449** LCS N11MD2130W	**523** WB-Grainfield	**549** Wesley	**623** Infinity CL	**649** WG "1863"
124 Warhorse	**150** SYN 06BC722#25	**224** PG Brawl Cl Plus	**250** LCS Mint	**324** LCS N11MD2130W	**350** LCS LCH13NEDH-5-59	**424** LCS Wizard	**450** CO11D174	**524** SYN 06BC796#68	**550** HG Robidoux	**624** SY Wolf	**650** NX04Y2107W
125 Judee	**151** SYN 06BC796#68	**225** WB Winterhawk	**251** NE10589	**325** SYN 06BC796#68	**351** Judee	**425** HG Overland Ever & Gau	**451** LCS LCH10-13	**525** SYN 06BC722#25	**551** PG Denali	**625** Turkey	**651** Judee
126 Bearpaw	**152** LCS LCI13NEDH-14-53W	**226** NX11MD2337	**252** Judee	**326** WG "1863"	**352** LCS LCI13NEDH-14-53W	**426** HG Overland Gau	**452** Scout 66	**526** CO11D174	**552** NW07505 (W)	**626** Scout 66	**652** NI10718W

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PERKINS RAINFED
1535

Cooperator: UNL Stumpf Wheat Center; Grant, NE
Coordinates: 40.844986, –101.687411 Planted: 9/16/2014

101 Scout 66	127 NE10507	201 PG Denali	227 LCS LCH13NEDH-3-31	301 NI10718W	327 LCS LCH13NEDH-5-59	401 NE10683	427 LCS LCH10-13	501 HG Overland Ever & Gau	527 HG Robidoux	601 WG "1863"	627 Judee
102 Turkey	128 Infinity CL	202 SYN 06BC722#25	228 Mattern	302 SY Wolf	328 Mattern	402 PG Byrd	428 NE10507	502 PG Antero	528 HG Settler CL	602 HG Settler CL	628 NE10507
103 Wesley	129 Mace	203 CO11D174	229 Warhorse	303 LCS LCH10-13	329 LCS T158	403 NX11MD2337	429 SYN 06BC796#68	503 LCS LCI13NEDH-14-53W	529 NE09521	603 SYN 06BC796#68	629 LCS N11MD2130W
104 HG Overland	130 LCS LCH10-13	204 LCS T158	230 LCS Mint	304 Mace	330 PG Brawl Cl Plus	404 HG McGill	430 WB-Grainfield	504 NX11MD2337	530 NW03666 (W)	604 PG Byrd	630 PG Brawl Cl Plus
105 HG Overland Ever	131 LCS Mint	205 NX11MD2337	231 Judee	305 NE10589	331 PG Hatcher	405 NW07505 (W)	431 SY Wolf	505 NE09517	531 Freeman	605 PG Hatcher	631 LCS T158
106 HG Overland Gau	132 LCS T158	206 PG Byrd	232 PG Hatcher	306 HG Overland Gau	332 WG "1863"	406 PG Denali	432 NW03666 (W)	506 WB4458	532 Turkey	606 Turkey	632 NI10718W
107 HG Overland Ever & Gau	133 LCS Wizard	207 LCS LCI13NEDH-14-53W	233 HG Overland Gau	307 Warhorse	333 NE09521	407 PG Hatcher	433 WB4458	507 HG Overland Ever	533 NE10589	607 LCS LCH13NEDH-5-59	633 LCS LCH13NEDH-3-31
108 HG McGill	134 SY Wolf	208 PG Antero	234 HG Overland	308 NE09517	334 NE10507	408 NE10589	434 Scout 66	508 LCS Wizard	534 WG "1863"	608 NE09521	634 LCS Wizard
109 HG Settler CL	135 Syn Monument	209 LCS LCH13NEDH-5-59	235 Scout 66	309 HG Overland Ever	335 Syn Monument	409 HG Overland Gau	435 N11MD2166W	509 HG Overland Gau	535 LCS LCH13NEDH-3-31	609 HG Robidoux	635 SYN 06BC722#25
110 Mattern	136 WB Winterhawk	210 Infinity CL	236 N11MD2166W	310 NE10683	336 NX04Y2107W	410 LCS LCH13NEDH-3-31	436 WG "1863"	510 NE10683	536 NI10718W	610 Wesley	636 HG Overland
111 Freeman	137 WB4458	211 NE09521	237 HG Settler CL	311 NX11MD2337	337 Bearpaw	411 HG Overland Ever	437 NI10718W	511 Wesley	537 WB-Grainfield	611 PG Denali	637 Syn Monument
112 NW07505 (W)	138 WB-Grainfield	212 WG "1863"	238 NE10683	312 NE10478	338 HG Settler CL	412 LCS LCH13NEDH-5-59	438 Syn Monument	512 PG Brawl Cl Plus	538 HG McGill	612 NW07505 (W)	638 Infinity CL
113 NE09517	139 PG Brawl Cl Plus	213 WB-Grainfield	239 WB4458	313 Infinity CL	339 Wesley	413 LCS Mint	439 HG Robidoux	513 LCS LCH10-13	539 N11MD2166W	613 PG Antero	639 NE10478
114 NE09521	140 PG Hatcher	214 SY Wolf	240 WB Winterhawk	314 LCS LCI13NEDH-14-53W	340 Judee	414 Mace	440 LCS LCI13NEDH-14-53W	514 NE10478	540 Syn Monument	614 HG McGill	640 WB4458
115 NE10589	141 PG Byrd	215 HG Overland Ever	241 Bearpaw	315 CO11D174	341 Turkey	415 WG KanMark	441 PG Brawl Cl Plus	515 Infinity CL	541 NW07505 (W)	615 WB-Grainfield	641 CO11D174
116 NE10478	142 PG Denali	216 Syn Monument	242 NE10507	316 NW03666 (W)	342 HG McGill	416 CO11D174	442 Turkey	516 NE10507	542 Warhorse	616 Bearpaw	642 NX04Y2107W
117 NX04Y2107W	143 PG Antero	217 LCS Wizard	243 NE09517	317 PG Byrd	343 HG Overland	417 Judee	443 LCS Wizard	517 Mattern	543 PG Hatcher	617 WB Winterhawk	643 Warhorse
118 HG Robidoux	144 WG "1863"	218 SYN 06BC796#68	244 PG Brawl Cl Plus	318 SYN 06BC722#25	344 HG Overland Ever & Gau	418 HG Overland Ever & Gau	444 Mattern	518 LCS Mint	544 NX04Y2107W	618 HG Overland Ever	644 NE10589
119 NI10718W	145 WG KanMark	219 HG Overland Ever & Gau	245 HG Robidoux	319 PG Antero	345 Freeman	419 LCS N11MD2130W	445 Warhorse	519 CO11D174	545 SY Wolf	619 SY Wolf	645 NE10683
120 NX11MD2337	146 CO11D174	220 Wesley	246 LCS N11MD2130W	320 LCS N11MD2130W	346 PG Denali	420 Bearpaw	446 HG Settler CL	520 SYN 06BC796#68	546 LCS LCH13NEDH-5-59	620 HG Overland Ever & Gau	646 LCS LCI13NEDH-14-53W
121 N11MD2166W	147 LCS LCH13NEDH-5-59	221 Mace	247 LCS LCH10-13	321 N11MD2166W	347 LCS LCH13NEDH-3-31	421 NE09517	447 NX04Y2107W	521 Bearpaw	547 WB Winterhawk	621 NW03666 (W)	647 Scout 66
122 NW03666 (W)	148 LCS LCH13NEDH-3-31	222 NI10718W	248 Turkey	322 LCS Mint	348 WB Winterhawk	422 HG Overland	448 SYN 06BC722#25	522 Judee	548 WG KanMark	622 Freeman	648 HG Overland Gau
123 NE10683	149 LCS N11MD2130W	223 NX04Y2107W	249 NE10589	323 WB4458	349 Scout 66	423 Freeman	449 Infinity CL	523 Mace	549 Scout 66	623 Mattern	649 Mace
124 Warhorse	150 SYN 06BC722#25	224 Freeman	250 NW03666 (W)	324 LCS Wizard	350 WG KanMark	424 NE10478	450 Wesley	524 HG Overland	550 LCS T158	624 N11MD2166W	650 NE09517
125 Judee	151 SYN 06BC796#68	225 NW07505 (W)	251 WG KanMark	325 SYN 06BC796#68	351 NW07505 (W)	425 WB Winterhawk	451 PG Antero	525 SYN 06BC722#25	551 LCS N11MD2130W	625 NX11MD2337	651 LCS LCH10-13
126 Bearpaw	152 LCS LCI13NEDH-14-53W	226 HG McGill	252 NE10478	326 HG Robidoux	352 WB-Grainfield	426 NE09521	452 LCS T158	526 PG Byrd	552 PG Denali	626 WG KanMark	652 LCS Mint

CHEYENNE RAINFED

1541

Cooperator: High Plains Ag Lab; Sidney, NE
Coordinates: 41.23171, –103.014959 **Planted:** 9/10/2014

3001	3010	3011	3020	3021	3030	3031	3040	Triticale VT	
3002	3009	3012	3019	3022	3029	3032	3039		
3003	3008	3013	3018	3023	3028	3033	3038		
3004	3007	3014	3017	3024	3027	3034	3037		
3005	3006	3015	3016	3025	3026	3035	3036		
		R	E	D	R	O	B		
1	**101** Scout 66	**160** Fill	**201** WB-Grainfield	**260** Fill	**301** Turkey	**360** Fill	**401** Overland Gau	**460** Fill	**501** Turkey	**560** Fill
2	**102** Turkey	**159** Pronghorn	**202** Bearpaw	**259** Pronghorn	**302** Warhorse	**359** Pronghorn	**402** WB-Grainfield	**459** Pronghorn	**502** Robidoux	**559** Pronghorn
3	**103** Wesley	**158** LCI13NEDH-14-53W	**203** T158	**258** LCI13NEDH-14-53W	**303** Monument	**358** Settler CL	**403** NE10507	**458** NX04Y2107W	**503** Byrd	**558** Antero
4	**104** Overland	**157** LCH13NEDH-3-31	**204** Cowboy	**257** Overland Gau	**304** Infinity CL	**357** Ideal	**404** Turkey	**457** Scout 66	**504** Web-Quake	**557** NE10478
5	**105** Overland Ever	**156** LCH13NEDH-5-59	**205** Alliance	**256** NW07505 (W)	**305** LCS Wizard	**356** N11MD2166W	**405** NW03666 (W)	**456** Settler CL	**505** Ideal	**556** Hatcher
6	**106** Overland Gau	**155** CO11D174	**206** Warhorse	**255** NX04Y2107W	**306** Web-Quake	**355** Alliance	**406** Winterhawk	**455** NI10718W	**506** Wesley	**555** Freeman
7	**107** Overland Ever & Gau	**154** Oakley CL	**207** WB4458	**254** Redfield	**307** Robidoux	**354** NX04Y2107W	**407** Overland Ever & Gau	**454** NE10589	**507** Infinity CL	**554** Mattern
8	**108** Camelot	**153** KanMark	**208** NE10507	**253** Monument	**308** LCH13NEDH-5-59	**353** NX11MD2337	**408** NE09517	**453** LCS Mint	**508** LCI13NEDH-14-53W	**553** NE09521
9	**109** Settler CL	**152** Web-Quake	**209** NE10683	**252** N11MD2166W	**309** Mattern	**352** Brawl CI Plus	**409** LCI13NEDH-14-53W	**452** Overland	**509** Bearpaw	**552** NE10589
10	**110** Mattern	**151** Redfield	**210** NE09517	**251** NE05548 (Panhandle)	**310** Goodstreak	**351** Oakley CL	**410** Ideal	**451** LCH13NEDH-3-31	**510** NW03666 (W)	**551** CO11D174
11	**111** Freeman	**150** Ideal	**211** NE10589	**250** Settler CL	**311** NW07505 (W)	**350** Camelot	**411** NE09521	**450** NE10478	**511** T158	**550** KanMark
12	**112** NW07505 (W)	**149** WB4059CLP	**212** Overland Ever	**249** Brawl CI Plus	**312** NE10589	**349** Overland	**412** Monument	**449** T158	**512** SY Wolf	**549** LCS Wizard
13	**113** NE05548 (Panhandle)	**148** Cowboy	**213** NE09521	**248** LCH13NEDH-3-31	**313** Overland Gau	**348** NE09521	**413** Antero	**448** Brawl CI Plus	**513** Scout 66	**548** Overland Ever & Gau
14	**114** Buckskin	**147** Antero	**214** NX11MD2337	**247** Ideal	**314** Freeman	**347** NI10718W	**414** Web-Quake	**447** Bearpaw	**514** N11MD2166W	**547** LCS Mint
15	**115** NE09517	**146** Denali	**215** Freeman	**246** LCH13NEDH-5-59	**315** LCH13NEDH-3-31	**346** LCH10-13	**415** NE05548 (Panhandle)	**446** Camelot	**515** Mace	**546** LCH10-13
16	**116** NE09521	**145** Byrd	**216** Oakley CL	**245** LCH10-13	**316** NE10507	**345** NW03666 (W)	**416** Overland Ever	**445** WB4458	**516** NX04Y2107W	**545** Cowboy
17	**117** NE10589	**144** Hatcher	**217** CO11D174	**244** Web-Quake	**317** LCS Mint	**344** Overland Ever	**417** CO11D174	**444** Oakley CL	**517** LCH13NEDH-5-59	**544** Overland
18	**118** NE10478	**143** Brawl CI Plus	**218** Overland	**243** NI10718W	**318** NE10478	**343** Hatcher	**418** Infinity CL	**443** SY Wolf	**518** Redfield	**543** Oakley CL
19	**119** NX04Y2107W	**142** WB-Grainfield	**219** Overland Ever & Gau	**242** Denali	**319** NE05548 (Panhandle)	**342** Bearpaw	**419** Alliance	**442** Goodstreak	**519** NE05548 (Panhandle)	**542** Goodstreak
20	**120** Robidoux	**141** WB4458	**220** Mattern	**241** Hatcher	**320** Buckskin	**341** Antero	**420** LCH13NEDH-5-59	**441** Mace	**520** WB4059CLP	**541** Camelot
21	**121** NI10718W	**140** Winterhawk	**221** Byrd	**240** LCS Wizard	**321** Judee	**340** Redfield	**421** NW07505 (W)	**440** NE10683	**521** NX11MD2337	**540** Monument
22	**122** NX11MD2337	**139** Monument	**222** Winterhawk	**239** Buckskin	**322** LCI13NEDH-14-53W	**339** WB4059CLP	**422** NX11MD2337	**439** KanMark	**522** Overland Gau	**539** Warhorse
23	**123** N11MD2166W	**138** SY Wolf	**223** NE10478	**238** NW03666 (W)	**323** NE10683	**338** Denali	**423** Denali	**438** Freeman	**523** Alliance	**538** Buckskin
24	**124** NW03666 (W)	**137** LCS Wizard	**224** Antero	**237** Mace	**324** NE09517	**337** SY Wolf	**424** LCH10-13	**437** N11MD2166W	**524** NI10718W	**537** Judee
25	**125** NE10683	**136** T158	**225** Wesley	**236** KanMark	**325** Winterhawk	**336** CO11D174	**425** Buckskin	**436** Warhorse	**525** NE09517	**536** WB4458
26	**126** Warhorse	**135** LCS Mint	**226** Turkey	**235** WB4059CLP	**326** Cowboy	**335** WB-Grainfield	**426** LCS Wizard	**435** Wesley	**526** Settler CL	**535** Overland Ever
27	**127** Judee	**134** LCH10-13	**227** Robidoux	**234** SY Wolf	**327** Wesley	**334** WB4458	**427** Judee	**434** Redfield	**527** NE10683	**534** NW07505 (W)
28	**128** Bearpaw	**133** Alliance	**228** Judee	**233** Goodstreak	**328** Scout 66	**333** Overland Ever & Gau	**428** Hatcher	**433** Mattern	**528** Winterhawk	**533** WB-Grainfield
29	**129** NE10507	**132** Mace	**229** Scout 66	**232** Infinity CL	**329** KanMark	**332** Byrd	**429** Robidoux	**432** Cowboy	**529** Brawl CI Plus	**532** LCH13NEDH-3-31
30	**130** Goodstreak	**131** Infinity CL	**230** LCS Mint	**231** Camelot	**330** T158	**331** Mace	**430** Byrd	**431** WB4059CLP	**530** Denali	**531** NE10507
		R	E	D	R	O	B		
	1	2	3	4	5	6	7	8	9	10

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KIMBALL RAINFED

1542

Coordinates: 41.07677, –103.29434 **Planted:** 9/10/2014

		R	E	D	R	O	B		
1	2	3	4	5	6	7	8	9	10
1	**101** Scout 66	**160** Fill	**201** Settler CL	**260** Fill	**301** Turkey	**360** Fill	**401** Bearpaw	**460** Fill	**501** Panhandle	**560** Fill
2	**102** Turkey	**159** Pronghorn	**202** Infinity CL	**259** Pronghorn	**302** Camelot	**359** Pronghorn	**402** Hatcher	**459** Pronghorn	**502** Overland Ever & Gau	**559** Pronghorn
3	**103** Wesley	**158** LCI13NEDH-14-53W	**203** T158	**258** Mace	**303** SY Wolf	**358** WB4458	**403** Cowboy	**458** WB4458	**503** NE09517	**558** Redfield
4	**104** Overland	**157** LCH13NEDH-3-31	**204** NI10718W	**257** NE09521	**304** Overland Ever & Gau	**357** NE10589	**404** NI10718W	**457** Brawl CI Plus	**504** Ideal	**557** Overland
5	**105** Overland Ever	**156** LCH13NEDH-5-59	**205** Antero	**256** NW07505 (W)	**305** Mace	**356** WB4059CLP	**405** Warhorse	**456** Panhandle	**505** LCH13NEDH-3-31	**556** Bearpaw
6	**106** Overland Gau	**155** CO11D174	**206** LCH10-13	**255** Redfield	**306** Mattern	**355** LCH10-13	**406** LCH13NEDH-3-31	**455** Wesley	**506** NW07505 (W)	**555** SY Wolf
7	**107** Overland Ever & Gau	**154** Oakley CL	**207** Cowboy	**254** Panhandle	**307** Wesley	**354** Bearpaw	**407** Web-Quake	**454** Denali	**507** Turkey	**554** NX11MD2337
8	**108** Camelot	**153** KanMark	**208** Turkey	**253** Winterhawk	**308** Oakley CL	**353** NW07505 (W)	**408** Infinity CL	**453** Winterhawk	**508** Scout 66	**553** NE10589
9	**109** Settler CL	**152** Web-Quake	**209** LCI13NEDH-14-53W	**252** WB4458	**309** Cowboy	**352** Infinity CL	**409** Monument	**452** NW03666 (W)	**509** Overland Gau	**552** LCI13NEDH-14-53W
10	**110** Mattern	**151** Redfield	**210** Buckskin	**251** NE10507	**310** Web-Quake	**351** Judee	**410** Scout 66	**451** Redfield	**510** WB4458	**551** Denali
11	**111** Freeman	**150** Ideal	**211** CO11D174	**250** NX11MD2337	**311** LCS Mint	**350** LCH13NEDH-5-59	**411** N11MD2166W	**450** NE10683	**511** Overland Ever	**550** Infinity CL
12	**112** NW07505 (W)	**149** WB4059CLP	**212** Byrd	**249** Robidoux	**312** Brawl CI Plus	**349** Alliance	**412** Overland Ever & Gau	**449** Ideal	**512** LCS Mint	**549** Warhorse
13	**113** Panhandle	**148** Cowboy	**213** Ideal	**248** WB-Grainfield	**313** Byrd	**348** WB-Grainfield	**413** Camelot	**448** LCS Mint	**513** Web-Quake	**548** Oakley CL
14	**114** Buckskin	**147** Antero	**214** LCH13NEDH-3-31	**247** LCH13NEDH-5-59	**314** Hatcher	**347** T158	**414** Overland Ever	**447** Robidoux	**514** WB-Grainfield	**547** NI10718W
15	**115** NE09517	**146** Denali	**215** WB4059CLP	**246** Overland Gau	**315** KanMark	**346** Ideal	**415** WB4059CLP	**446** KanMark	**515** LCH10-13	**546** Buckskin
16	**116** NE09521	**145** Byrd	**216** Denali	**245** Bearpaw	**316** Overland	**345** CO11D174	**416** Freeman	**445** NE10507	**516** WB4059CLP	**545** Goodstreak
17	**117** NE10589	**144** Hatcher	**217** Warhorse	**244** Web-Quake	**317** Freeman	**344** Denali	**417** CO11D174	**444** LCS Wizard	**517** KanMark	**544** Settler CL
18	**118** NE10478	**143** Brawl CI Plus	**218** NW03666 (W)	**243** Camelot	**318** Monument	**343** NX04Y2107W	**418** Buckskin	**443** WB-Grainfield	**518** Mace	**543** NX04Y2107W
19	**119** NX04Y2107W	**142** WB-Grainfield	**219** Monument	**242** Alliance	**319** Antero	**342** LCI13NEDH-14-53W	**419** Mace	**442** Mattern	**519** Mattern	**542** LCS Wizard
20	**120** Robidoux	**141** WB4458	**220** LCS Mint	**241** NE10683	**320** Scout 66	**341** NW03666 (W)	**420** Turkey	**441** NX04Y2107W	**520** Freeman	**541** T158
21	**121** NI10718W	**140** Winterhawk	**221** Mattern	**240** Freeman	**321** Robidoux	**340** Overland Ever	**421** SY Wolf	**440** Overland	**521** Robidoux	**540** NE10507
22	**122** NX11MD2337	**139** Monument	**222** LCS Wizard	**239** NE10478	**322** NX11MD2337	**339** Settler CL	**422** Byrd	**439** Goodstreak	**522** NE10478	**539** Brawl CI Plus
23	**123** N11MD2166W	**138** SY Wolf	**223** NX04Y2107W	**238** KanMark	**323** NE10507	**338** NE10478	**423** Judee	**438** NW07505 (W)	**523** Winterhawk	**538** CO11D174
24	**124** NW03666 (W)	**137** LCS Wizard	**224** Oakley CL	**237** Overland Ever	**324** Redfield	**337** NE09521	**424** NE10589	**437** NE10478	**524** Judee	**537** Hatcher
25	**125** NE10683	**136** T158	**225** Wesley	**236** Brawl CI Plus	**325** Panhandle	**336** Buckskin	**425** LCH13NEDH-5-59	**436** NX11MD2337	**525** Wesley	**536** NW03666 (W)
26	**126** Warhorse	**135** LCS Mint	**226** Hatcher	**235** Overland	**326** NI10718W	**335** Overland Gau	**426** NE09521	**435** Oakley CL	**526** LCH13NEDH-5-59	**535** Byrd
27	**127** Judee	**134** LCH10-13	**227** NE09517	**234** SY Wolf	**327** LCS Wizard	**334** Warhorse	**427** LCH10-13	**434** Overland Gau	**527** NE10683	**534** Alliance
28	**128** Bearpaw	**133** Alliance	**228** Judee	**233** Goodstreak	**328** NE09517	**333** NE10683	**428** Settler CL	**433** Alliance	**528** NE09521	**533** N11MD2166W
29	**129** NE10507	**132** Mace	**229** N11MD2166W	**232** Overland Ever & Gau	**329** LCH13NEDH-3-31	**332** Winterhawk	**429** NE09517	**432** LCI13NEDH-14-53W	**529** Monument	**532** Cowboy
30	**130** Goodstreak	**131** Infinity CL	**230** Scout 66	**231** NE10589	**330** N11MD2166W	**331** Goodstreak	**430** Antero	**431** T158	**530** Camelot	**531** Antero
		R	E	D	R	O	B		
	1	2	3	4	5	6	7	8	9	10

N

STATE-LINE RAINFED

1543

Coordinates: 41.46936, –104.03934 **Planted:** 9/13/2014

		R	E	D	R	O	B		
1	160 Fill	201 Goodstreak	260 Fill	301 LCH10-13	360 Fill	401 LCH13NEDH-3-31	460 Fill	501 NE10683	560 Fill
2	159 Pronghorn	202 Turkey	259 Pronghorn	302 Brawl CI Plus	359 Pronghorn	402 Alliance	459 Pronghorn	502 LCI13NEDH-14-53W	559 Pronghorn
3	158 LCI13NEDH-14-53W	203 WB-Grainfield	258 Settler CL	303 WB4059CLP	358 Alliance	403 Mattern	458 NE10683	503 Mattern	558 Bearpaw
4	157 LCH13NEDH-3-31	204 Freeman	257 Denali	304 LCH13NEDH-5-59	357 NE09517	404 NX04Y2107W	457 Hatcher	504 CO11D174	557 N11MD2166W
5	156 LCH13NEDH-5-59	205 Winterhawk	256 Camelot	305 Wesley	356 N11MD2166W	405 LCS Wizard	456 NW03666 (W)	505 T158	556 Redfield
6	155 CO11D174	206 LCH10-13	255 WB4458	306 WB4458	355 SY Wolf	406 Redfield	455 NE10589	506 NW03666 (W)	555 Mace
7	154 Oakley CL	207 Buckskin	254 CO11D174	307 Hatcher	354 KanMark	407 Judee	454 NE09517	507 Alliance	554 Warhorse
8	153 KanMark	208 NW03666 (W)	253 NE10683	308 Overland Gau	353 Denali	408 T158	453 Turkey	508 WB-Grainfield	553 NE10478
9	152 Web-Quake	209 Wesley	252 Ideal	309 Overland Ever & Gau	352 NE05548 (Panhandle)	409 NI10718W	452 Wesley	509 Goodstreak	552 NW07505 (W)
10	151 Redfield	210 Mace	251 Cowboy	310 NW03666 (W)	351 Overland Ever	410 Overland Gau	451 WB-Grainfield	510 Infinity CL	551 Cowboy
11	150 Ideal	211 LCH13NEDH-5-59	250 Scout 66	311 NE10683	350 Warhorse	411 Overland Ever	450 NE05548 (Panhandle)	511 NX04Y2107W	550 SY Wolf
12	149 WB4059CLP	212 NE10478	249 NI10718W	312 Goodstreak	349 Redfield	412 NE10478	449 Overland Ever & Gau	512 WB4059CLP	549 Turkey
13	148 Cowboy	213 Web-Quake	248 LCS Mint	313 NW07505 (W)	348 Buckskin	413 SY Wolf	448 Goodstreak	513 KanMark	548 Wesley
14	147 Antero	214 Judee	247 Warhorse	314 Monument	347 LCS Wizard	414 CO11D174	447 Brawl CI Plus	514 NX11MD2337	547 Ideal
15	146 Denali	215 LCI13NEDH-14-53W	246 LCH13NEDH-3-31	315 Byrd	346 Web-Quake	415 N11MD2166W	446 LCH13NEDH-5-59	515 Scout 66	546 Winterhawk
16	145 Byrd	216 KanMark	245 Alliance	316 Winterhawk	345 NE10478	416 Ideal	445 Scout 66	516 Denali	545 NE05548 (Panhandle)
17	144 Hatcher	217 WB4059CLP	244 Hatcher	317 Judee	344 NE10507	417 Web-Quake	444 NE10507	517 Overland Ever	544 Brawl CI Plus
18	143 Brawl CI Plus	218 NW07505 (W)	243 NE10507	318 WB-Grainfield	343 Bearpaw	418 Overland	443 Freeman	518 LCS Mint	543 NE10507
19	142 WB-Grainfield	219 NX11MD2337	242 NE09521	319 Settler CL	342 LCH13NEDH-3-31	419 Denali	442 Buckskin	519 Judee	542 Freeman
20	141 WB4458	220 NX04Y2107W	241 Antero	320 Scout 66	341 Mace	420 Cowboy	441 NE09521	520 NE09521	541 Web-Quake
21	140 Winterhawk	221 Overland Ever & Gau	240 Infinity CL	321 NI10718W	340 Turkey	421 Mace	440 KanMark	521 Overland Ever & Gau	540 LCH13NEDH-5-59
22	139 Monument	222 NE10589	239 LCS Wizard	322 Camelot	339 CO11D174	422 NW07505 (W)	439 Winterhawk	522 NE09517	539 Byrd
23	138 SY Wolf	223 T158	238 Overland Ever	323 Freeman	338 LCS Mint	423 Camelot	438 Bearpaw	523 Monument	538 Antero
24	137 LCS Wizard	224 SY Wolf	237 N11MD2166W	324 T158	337 Ideal	424 NX11MD2337	437 Warhorse	524 Settler CL	537 Hatcher
25	136 T158	225 NE09517	236 Byrd	325 Robidoux	336 Oakley CL	425 Byrd	436 Monument	525 Overland Gau	536 Buckskin
26	135 LCS Mint	226 Monument	235 Oakley CL	326 Infinity CL	335 Cowboy	426 WB4458	435 LCI13NEDH-14-53W	526 WB4458	535 Overland
27	134 LCH10-13	227 Mattern	234 Robidoux	327 NX04Y2107W	334 NE10589	427 Infinity CL	434 Robidoux	527 NE10589	534 Camelot
28	133 Alliance	228 Redfield	233 NE05548 (Panhandle)	328 Antero	333 NX11MD2337	428 LCS Mint	433 Oakley CL	528 Robidoux	533 Oakley CL
29	132 Mace	229 Brawl CI Plus	232 Overland	329 Overland	332 Mattern	429 WB4059CLP	432 Antero	529 LCS Wizard	532 LCH10-13
30	131 Infinity CL	230 Bearpaw	231 Overland Gau	330 LCI13NEDH-14-53W	331 NE09521	430 Settler CL	431 LCH10-13	530 LCH13NEDH-3-31	531 NI10718W
		R	E	D	R	O	B		

DAWES RAINFED

1544

Cooperator: Gil Nitsch; Chadron, NE
Coordinates: 42.49203, –102.55968
Planted: 9/17/2014

		R	E	D	R	O	B		
101 Scout 66	160 Fill	201 NE10507	260 Fill	301 Winterhawk	360 Fill	401 Web-Quake	460 Fill	501 N11MD2166W	560 Fill
102 Turkey	159 Pronghorn	202 Antero	259 Pronghorn	302 KanMark	359 Pronghorn	402 LCH10-13	459 Pronghorn	502 LCS Mint	559 Pronghorn
103 Wesley	158 LCI13NEDH-14-53W	203 SY Wolf	258 LCS Mint	303 Redfield	358 Web-Quake	403 Byrd	458 Buckskin	503 Antero	558 LCH10-13
104 Overland	157 LCH13NEDH-3-31	204 Goodstreak	257 LCH13NEDH-3-31	304 NE10589	357 NX11MD2337	404 NE09521	457 WB-Grainfield	504 Overland Ever	557 LCS Wizard
105 Overland Ever	156 LCH13NEDH-5-59	205 Infinity CL	256 Winterhawk	305 LCH13NEDH-3-31	356 Robidoux	405 LCH13NEDH-5-59	456 CO11D174	505 T158	556 Buckskin
106 Overland Gau	155 CO11D174	206 Alliance	255 Monument	306 Hatcher	355 Panhandle	406 Robidoux	455 Overland Ever	506 Cowboy	555 Mace
107 Overland Ever & Gau	154 Oakley CL	207 Camelot	254 NE10478	307 CO11D174	354 Mace	407 Alliance	454 N11MD2166W	507 Mattern	554 Settler CL
108 Camelot	153 KanMark	208 Denali	253 Wesley	308 Turkey	353 Mattern	408 NX04Y2107W	453 LCS Mint	508 Monument	553 NE09517
109 Settler CL	152 Web-Quake	209 LCH10-13	252 NX11MD2337	309 WB4458	352 Monument	409 Freeman	452 Bearpaw	509 Brawl CI Plus	552 NW07505 (W)
110 Mattern	151 Redfield	210 Settler CL	251 Overland Gau	310 T158	351 Cowboy	410 NE10507	451 LCI13NEDH-14-53W	510 CO11D174	551 NE10589
111 Freeman	150 Ideal	211 Web-Quake	250 Brawl CI Plus	311 NI10718W	350 Settler CL	411 NW07505 (W)	450 NX11MD2337	511 WB4059CLP	550 Oakley CL
112 NW07505 (W)	149 WB4059CLP	212 WB4458	249 Turkey	312 WB-Grainfield	349 LCS Mint	412 NE10478	449 NE10589	512 NE10478	549 Panhandle
113 Panhandle	148 Cowboy	213 NE09521	248 Redfield	313 Judee	348 Infinity CL	413 NE09517	448 T158	513 NX11MD2337	548 Scout 66
114 Buckskin	147 Antero	214 Overland Ever	247 WB4059CLP	314 NW03666 (W)	347 Scout 66	414 WB4059CLP	447 NI10718W	514 Bearpaw	547 Denali
115 NE09517	146 Denali	215 Mattern	246 Scout 66	315 Overland	346 Bearpaw	415 WB4458	446 Antero	515 Warhorse	546 NW03666 (W)
116 NE09521	145 Byrd	216 Overland Ever & Gau	245 NI10718W	316 N11MD2166W	345 Brawl CI Plus	416 LCS Wizard	445 NE10683	516 Ideal	545 NX04Y2107W
117 NE10589	144 Hatcher	217 Bearpaw	244 NW07505 (W)	317 Overland Ever	344 Overland Gau	417 Infinity CL	444 Scout 66	517 Hatcher	544 WB4458
118 NE10478	143 Brawl CI Plus	218 Cowboy	243 NX04Y2107W	318 NE10507	343 Warhorse	418 Settler CL	443 Mace	518 NE10683	543 Robidoux
119 NX04Y2107W	142 WB-Grainfield	219 WB-Grainfield	242 KanMark	319 Freeman	342 Ideal	419 Hatcher	442 Wesley	519 WB-Grainfield	542 NE10507
120 Robidoux	141 WB4458	220 Robidoux	241 Oakley CL	320 LCH13NEDH-5-59	341 SY Wolf	420 Denali	441 Overland Gau	520 Overland	541 Goodstreak
121 NI10718W	140 Winterhawk	221 Freeman	240 Buckskin	321 LCI13NEDH-14-53W	340 NE10683	421 Oakley CL	440 Redfield	521 Overland Gau	540 Winterhawk
122 NX11MD2337	139 Monument	222 NE10683	239 NE09517	322 Goodstreak	339 Denali	422 KanMark	439 Mattern	522 NE09521	539 SY Wolf
123 N11MD2166W	138 SY Wolf	223 NW03666 (W)	238 Byrd	323 NE09521	338 Buckskin	423 Goodstreak	438 Panhandle	523 KanMark	538 Byrd
124 NW03666 (W)	137 LCS Wizard	224 T158	237 Ideal	324 Antero	337 Camelot	424 Brawl CI Plus	437 Camelot	524 Turkey	537 LCI13NEDH-14-53W
125 NE10683	136 T158	225 LCS Wizard	236 Mace	325 LCS Wizard	336 NE10478	425 Winterhawk	436 NW03666 (W)	525 Infinity CL	536 NI10718W
126 Warhorse	135 LCS Mint	226 Hatcher	235 Warhorse	326 LCH10-13	335 Wesley	426 Monument	435 Overland	526 LCH13NEDH-5-59	535 Freeman
127 Judee	134 LCH10-13	227 LCI13NEDH-14-53W	234 N11MD2166W	327 Byrd	334 Oakley CL	427 Cowboy	434 Turkey	527 Judee	534 Alliance
128 Bearpaw	133 Alliance	228 Overland	233 Panhandle	328 NW07505 (W)	333 NE09517	428 SY Wolf	433 Overland Ever & Gau	528 Web-Quake	533 Wesley
129 NE10507	132 Mace	229 Judee	232 CO11D174	329 Alliance	332 WB4059CLP	429 Warhorse	432 Judee	529 LCH13NEDH-3-31	532 Camelot
130 Goodstreak	131 Infinity CL	230 NE10589	231 LCH13NEDH-5-59	330 NX04Y2107W	331 Overland Ever & Gau	430 LCH13NEDH-3-31	431 Ideal	530 Overland Ever & Gau	531 Redfield
		R	E	D	R	O	B		

N

BOX BUTTE RAINFED

1545

Cooperator: Cullan Farms; Hemmingford, NE
Coordinates: 42.24911, -103.01468 **Planted:** 9/9/2014

Range	Row		1 - 35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50		
13-32																				
12	F	F		111 LCI13NEDH-14-53W	112 Wesley	113 Monument	114 LCH10-13	115 NE10683	116 Ideal	117 Mace	118 LCH13NEDH-5-59	119 Pronghorn	120 Fill	176 Oakley CL	177 NE10683	178 Camelot	179 Pronghorn	180 Fill	F	F
11	F	F		101 LCS Mint	102 Overland Ever & Gau	103 NE09517	104 Hatcher	105 NI10718W	106 Antero	107 Scout 66	108 Bearpaw	109 Freeman	110 LCH13NEDH-3-31	171 NE09517	172 Mattern	173 Hatcher	174 Cowboy	175 Warhorse	F	F
10	F	F		91 Byrd	92 LCS Wizard	93 NE10478	94 KanMark	95 NX11MD2337	96 Camelot	97 Mattern	98 NE10507	99 Goodstreak	100 Panhandle	166 Ideal	167 Settler CL	168 NE10589	169 LCS Wizard	170 NI10718W	F	F
9	F	F		81 Denali	82 NE09521	83 Cowboy	84 Buckskin	85 CO11D174	86 Redfield	87 NX04Y2107W	88 SY Wolf	89 Overland Ever	90 Infinity CL	161 NE10478	162 KanMark	163 Buckskin	164 Denali	165 Panhandle	F	F
8	F	F		71 Brawl Cl Plus	72 Web-Quake	73 WB4059CLP	74 Robidoux	75 WB4458	76 Oakley CL	77 NW03666 (W)	78 Turkey	79 Overland Gau	80 NW07505 (W)	156 Wesley	157 Antero	158 Monument	159 Overland	160 NW03666 (W)	F	F
7	F	F		61 Settler CL	62 Overland	63 T158	64 Judee	65 WB-Grainfield	66 Warhorse	67 Winterhawk	68 NE10589	69 N11MD2166W	70 Alliance	151 Winterhawk	152 N11MD2166W	153 LCS Mint	154 LCH13NEDH-5-59	155 Goodstreak	F	F
6	F	F		51 LCH10-13	52 Camelot	53 WB-Grainfield	54 Overland Ever	55 Hatcher	56 Web-Quake	57 Warhorse	58 KanMark	59 Pronghorn	60 Fill	146 WB4458	147 NW07505 (W)	148 Alliance	149 Byrd	150 LCH10-13	F	F
5	F	F		41 Settler CL	42 SY Wolf	43 NE10589	44 T158	45 NE10507	46 Wesley	47 NX04Y2107W	48 NE10478	49 Mace	50 Oakley CL	141 LCH13NEDH-3-31	142 Overland Ever	143 LCI13NEDH-14-53W	144 Overland Ever & Gau	145 Mace	F	F
4	F	F		31 NW07505 (W)	32 Bearpaw	33 Byrd	34 Overland	35 Cowboy	36 Antero	37 NI10718W	38 NW03666 (W)	39 NE10683	40 LCI13NEDH-14-53W	136 Web-Quake	137 Redfield	138 WB4059CLP	139 NX04Y2107W	140 Scout 66	F	F
3	F	F		21 WB4458	22 Scout 66	23 N11MD2166W	24 Winterhawk	25 Judee	26 Buckskin	27 Panhandle	28 CO11D174	29 Alliance	30 LCS Wizard	131 NX11MD2337	132 T158	133 SY Wolf	134 Turkey	135 Judee	F	F
2	F	F		11 Redfield	12 WB4059CLP	13 NX11MD2337	14 Overland Gau	15 Mattern	16 Overland Ever & Gau	17 LCS Mint	18 Infinity CL	19 LCH13NEDH-3-31	20 Ideal	126 Overland Gau	127 Brawl Cl Plus	128 Freeman	129 NE09521	130 CO11D174	F	F
1	F	F		1 Denali	2 LCH13NEDH-5-59	3 Brawl Cl Plus	4 Turkey	5 NE09517	6 NE09521	7 Robidoux	8 Monument	9 Goodstreak	10 Freeman	121 Robidoux	122 Infinity CL	123 Bearpaw	124 WB-Grainfield	125 NE10507	F	F

BOX BUTTE IRRIGATED

1551

Cooperator: Darby Jesperson; Hemmingford, NE
Coordinates: 42.19919, -103.04352 Planted: 9/26/2014

		R	E	D		R	O	B		
1	**352** NI14733	**401** LCS Wizard	**452** LCH10-13	**501** NE10507	**552** NE10478		**101** Wesley	**152** LCI13NEDH-14-53W	**201** Anton (W)	**252** NE09521	**301** WB-Grainfield
2	**351** NE10478	**402** Wesley	**451** Anton (W)	**502** NI14733	**551** Wesley		**102** Overland Ever	**151** 06BC796#68	**202** Overland Ever & Gau	**251** NI14732	**302** LCI13NEDH-14-53W
3	**350** LCH13NEDH-5-59	**403** NE10683	**450** LCH13NEDH-5-59	**503** NW07505 (W)	**550** NX11MD2337		**103** Overland Gau	**150** 06BC722#25	**203** KanMark	**250** Byrd	**303** Brawl CI Plus
4	**349** T158	**404** NE09521	**449** NW03666 (W)	**504** Overland Gau	**549** Byrd		**104** Overland Ever & Gau	**149** N11MD2130W	**204** NE07531	**249** LCS Mint	**304** Overland Ever
5	**348** NE09521	**405** N11MD2130W	**448** Antero	**505** NI13717	**548** NI10718W		**105** Settler CL	**148** LCH13NEDH-3-31	**205** Denali	**248** NW03666 (W)	**305** NE10683
6	**347** WB-Cedar	**406** Oakley CL	**447** LCI13NEDH-14-53W	**506** NI12713W	**547** T158		**106** Mattern	**147** LCH13NEDH-5-59	**206** NE10683	**247** NE09517	**306** Overland Ever & Gau
7	**346** NW07505 (W)	**407** Settler CL	**446** NI06736	**507** NE09521	**546** Settler CL		**107** NW07505 (W)	**146** Oakley CL	**207** Judee	**246** NE10589	**307** Wesley
8	**345** NX11MD2337	**408** NE10478	**445** NE10507	**508** Winterhawk	**545** Pronghorn		**108** NE07531	**145** KanMark	**208** "1863"	**245** Overland Gau	**308** Bearpaw
9	**344** Antero	**409** NE07531	**444** KanMark	**509** SY Wolf	**544** WB-Grainfield		**109** NE09517	**144** "1863"	**209** 06BC796#68	**244** NX11MD2337	**309** Winterhawk
10	**343** LCH13NEDH-3-31	**410** NI12713W	**443** LCS Mint	**510** NE09517	**543** Denali		**110** NE09521	**143** Cowboy	**210** SY Wolf	**243** Oakley CL	**310** 06BC796#68
11	**342** Robidoux	**411** "1863"	**442** NE09517	**511** 06BC722#25	**542** NI14732		**111** NE10589	**142** Antero	**211** Wesley	**242** T158	**311** NE09517
12	**341** LCH10-13	**412** NI13717	**441** Bearpaw	**512** Warhorse	**541** NX04Y2107W		**112** NE10478	**141** Denali	**212** LCH13NEDH-3-31	**241** LCH10-13	**312** NE10507
13	**340** NI06736	**413** NE10589	**440** WB-Cedar	**513** Cowboy	**540** Overland Ever & Gau		**113** NX04Y2107W	**140** Byrd	**213** Mattern	**240** Brawl CI Plus	**313** NW03666 (W)
14	**339** NI10718W	**414** Cowboy	**439** NW07505 (W)	**514** LCS Wizard	**539** NW03666 (W)		**114** NI06736	**139** Brawl CI Plus	**214** NE10478	**239** Cowboy	**314** Byrd
15	**338** NI12713W	**415** 06BC796#68	**438** Overland Gau	**515** "1863"	**538** LCH10-13		**115** Robidoux	**138** WB-Cedar	**215** WB-Cedar	**238** NE10507	**315** SY Wolf
16	**337** NX04Y2107W	**416** Overland Ever & Gau	**437** Brawl CI Plus	**516** Overland Ever	**537** NE10683		**116** NI10718W	**137** WB-Grainfield	**216** LCS Wizard	**237** Winterhawk	**316** Denali
17	**336** Pronghorn	**417** NI10718W	**436** Byrd	**517** Oakley CL	**536** 06BC796#68		**117** NX11MD2337	**136** WB4458	**217** Warhorse	**236** NI10718W	**317** NI14732
18	**335** N11MD2130W	**418** LCH13NEDH-3-31	**435** Overland Ever	**518** Mattern	**535** Judee		**118** NW03666 (W)	**135** Winterhawk	**218** WB-Grainfield	**235** Bearpaw	**318** NE10589
19	**334** Judee	**419** Mattern	**434** WB-Grainfield	**519** Brawl CI Plus	**534** Robidoux		**119** NE10683	**134** SY Wolf	**219** Pronghorn	**234** NX04Y2107W	**319** LCS Mint
20	**333** Settler CL	**420** Denali	**433** NX11MD2337	**520** KanMark	**533** WB-Cedar		**120** Warhorse	**133** LCS Wizard	**220** Robidoux	**233** NI13717	**320** NI13717
21	**332** NE07531	**421** Pronghorn	**432** Robidoux	**521** NE10589	**532** Anton (W)		**121** Judee	**132** T158	**221** NI14733	**232** LCH13NEDH-5-59	**321** WB4458
22	**331** Mattern	**422** NX04Y2107W	**431** Winterhawk	**522** WB4458	**531** LCI13NEDH-14-53W		**122** Bearpaw	**131** LCS Mint	**222** LCI13NEDH-14-53W	**231** N11MD2130W	**322** 06BC722#25
23	**330** Warhorse	**423** T158	**430** Judee	**523** NI06736	**530** NE07531		**123** NI14732	**130** LCH10-13	**223** NI06736	**230** WB4458	**323** Oakley CL
24	**329** LCS Wizard	**424** Warhorse	**429** NI14732	**524** Antero	**529** N11MD2130W		**124** NI14733	**129** Anton (W)	**224** Antero	**229** NI12713W	**324** "1863"
25	**328** Overland Gau	**425** 06BC722#25	**428** NI14733	**525** LCS Mint	**528** LCH13NEDH-3-31		**125** NI13717	**128** Pronghorn	**225** 06BC722#25	**228** NW07505 (W)	**325** Anton (W)
26	**327** KanMark	**426** WB4458	**427** SY Wolf	**526** Bearpaw	**527** LCH13NEDH-5-59		**126** NI12713W	**127** NE10507	**226** Settler CL	**227** Overland Ever	**326** Cowboy
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CHASE IRRIGATED

1553

Cooperator: Tom Luhrs; Enders, NE
Coordinates: 40.48393, -101.49732

Planted: 9/26/2014

101 Wesley	201 NE10589	301 SYN SY Wolf	401 NE09517	501 NE09517	601 Warhorse
102 HG Overland Ever	202 Warhorse	302 SYN 06BC722#25	402 PG Byrd	502 SYN 06BC796#68	602 Mattern
103 HG Overland Gau	203 SYN 06BC796#68	303 LCS LCH10-13	403 HG Settler CL	503 WG KanMark	603 HG Overland Ever & Gau
104 HG Overland Ever & Gau	204 Anton (W)	304 WB4458	404 NX04Y2107W	504 WB-Cedar	604 LCS T158
105 HG Settler CL	205 HG Overland Ever & Gau	305 Pronghorn	405 NI14733	505 LCS N11MD2130W	605 WG KanMark
106 Mattern	206 LCS Wizard	306 NX04Y2107W	406 NE07531	506 HG Overland Ever	606 HG Overland Ever
107 NW07505 (W)	207 LCS LCH13NEDH-5-59	307 NE09521	407 PG Antero	507 PG Byrd	607 NW07505 (W)
108 NE07531	208 NE10683	308 NE10478	408 SYN SY Wolf	508 WB4458	608 NW03666 (W)
109 NE09517	209 NI14732	309 CRFW Cowboy	409 LCS LCH13NEDH-5-59	509 NE09521	609 SYN 06BC722#25
110 NE09521	210 HG Settler CL	310 SYN 06BC796#68	410 NI14732	510 LCS LCH10-13	610 Wesley
111 NE10589	211 NE09517	311 LCS T158	411 LCS LCH13NEDH-3-31	511 NE10478	611 WB-Grainfield
112 NE10478	212 LCS LCH13NEDH-3-31	312 HG Overland Ever	412 NI06736	512 NI06736	612 LCS LCH13NEDH-5-59
113 NX04Y2107W	213 NI06736	313 WG KanMark	413 HG Robidoux	513 HG Overland Gau	613 Judee
114 NI06736	214 NW07505 (W)	314 Judee	414 Wesley	514 Judee	614 LCS N11MD2130W
115 HG Robidoux	215 Pronghorn	315 WB-Cedar	415 NE10478	515 HG Overland Ever & Gau	615 HG Robidoux
116 NI10718W	216 WB-Cedar	316 Anton (W)	416 SYN 06BC722#25	516 LCS LCH13NEDH-3-31	616 PG Denali
117 NX11MD2337	217 LCS N11MD2130W	317 WB-Grainfield	417 WB-Grainfield	517 NI10718W	617 SYN SY Wolf
118 NW03666 (W)	218 SYN SY Wolf	318 Wesley	418 Pronghorn	518 LCS LCI13NEDH-14-53W	618 NI06736
119 NE10683	219 NE07531	319 LCS LCI13NEDH-14-53W	419 LCS Mint	519 LCS Wizard	619 NI14732
120 Warhorse	220 WB-Grainfield	320 NE07531	420 Warhorse	520 NI14732	620 NE09517
121 Judee	221 NI13717	321 WB Winterhawk	421 HG Overland Ever & Gau	521 Wesley	621 NX04Y2107W
122 Bearpaw	222 Bearpaw	322 NW03666 (W)	422 WB4458	522 Bearpaw	622 NX11MD2337
123 NI14732	223 NE10478	323 NW07505 (W)	423 Mattern	523 WG Oakley CL	623 NI12713W
124 NI14733	224 LCS LCH10-13	324 WG "1863"	424 CRFW Cowboy	524 NE07531	624 CRFW Cowboy
125 NI13717	225 PG Brawl Cl Plus	325 Warhorse	425 NE10683	525 NW03666 (W)	625 NI13717
126 NI12713W	226 NX04Y2107W	326 NI10718W	426 NI13717	526 CRFW Cowboy	626 HG Overland Gau
127 NE10507	227 WG "1863"	327 NI12713W	427 NI10718W	527 Mattern	627 WB4458
128 Pronghorn	228 NI12713W	328 NI14732	428 WG "1863"	528 PG Antero	628 NE10683
129 Anton (W)	229 NI14733	329 NX11MD2337	429 HG Overland Gau	529 LCS T158	629 WG Oakley CL
130 LCS LCH10-13	230 WG KanMark	330 WG Oakley CL	430 LCS T158	530 PG Brawl Cl Plus	630 WG "1863"
131 LCS Mint	231 NW03666 (W)	331 NE10683	431 NW07505 (W)	531 NI13717	631 LCS LCI13NEDH-14-53W
132 LCS T158	232 CRFW Cowboy	332 Bearpaw	432 Judee	532 NE10683	632 PG Brawl Cl Plus
133 LCS Wizard	233 LCS Mint	333 LCS N11MD2130W	433 NE10507	533 NX04Y2107W	633 NE07531
134 SYN SY Wolf	234 PG Antero	334 LCS Wizard	434 NE10589	534 LCS LCH13NEDH-5-59	634 WB-Cedar
135 WB Winterhawk	235 Mattern	335 HG Overland Ever & Gau	435 WG KanMark	535 WB Winterhawk	635 WB Winterhawk
136 WB4458	236 SYN 06BC722#25	336 PG Antero	436 WG Oakley CL	536 NI12713W	636 Bearpaw
137 WB-Grainfield	237 HG Overland Gau	337 NI06736	437 LCS LCI13NEDH-14-53W	537 NW07505 (W)	637 LCS Wizard
138 WB-Cedar	238 PG Byrd	338 LCS Mint	438 NW03666 (W)	538 HG Robidoux	638 LCS Mint
139 PG Brawl Cl Plus	239 HG Overland Ever	339 NI13717	439 WB Winterhawk	539 Warhorse	639 LCS LCH13NEDH-3-31
140 PG Byrd	240 WB Winterhawk	340 Mattern	440 NE09521	540 WB-Grainfield	640 Pronghorn
141 PG Denali	241 LCS T158	341 NE10589	441 SYN 06BC796#68	541 PG Denali	641 NI10718W
142 PG Antero	242 Wesley	342 HG Robidoux	442 HG Overland Ever	542 Anton (W)	642 NE10478
143 CRFW Cowboy	243 WB4458	343 NE09517	443 PG Denali	543 SYN 06BC722#25	643 LCS LCH10-13
144 WG "1863"	244 PG Denali	344 PG Brawl Cl Plus	444 NI12713W	544 Pronghorn	644 NI14733
145 WG KanMark	245 NE09521	345 PG Denali	445 NX11MD2337	545 HG Settler CL	645 PG Byrd
146 WG Oakley CL	246 NI10718W	346 LCS LCH13NEDH-3-31	446 LCS Wizard	546 NE10589	646 HG Settler CL
147 LCS LCH13NEDH-5-59	247 Judee	347 NE10507	447 LCS LCH10-13	547 NE10507	647 SYN 06BC796#68
148 LCS LCH13NEDH-3-31	248 NX11MD2337	348 HG Settler CL	448 PG Brawl Cl Plus	548 LCS Mint	648 PG Antero
149 LCS N11MD2130W	249 WG Oakley CL	349 LCS LCH13NEDH-5-59	449 LCS N11MD2130W	549 NX11MD2337	649 Anton (W)
150 SYN 06BC722#25	250 HG Robidoux	350 NI14733	450 Anton (W)	550 NI14733	650 NE10507
151 SYN 06BC796#68	251 LCS LCI13NEDH-14-53W	351 HG Overland Gau	451 Bearpaw	551 WG "1863"	651 NE09521
152 LCS LCI13NEDH-14-53W	252 NE10507	352 PG Byrd	452 WB-Cedar	552 SYN SY Wolf	652 NE10589

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Wheat Foods Council

Kernels

Vol. 11
April 2015

Michele Tuttle, MPH, RD – One Grainy Athlete

Grain Chain Supports Grain Recommendations In Dietary Report

Anyway You Slice It, Pie Comes Up Delicious

PLUS:

New Recipes, Studies, and Trending Foods

A Word From Judi Adams

One of the reasons I became a registered dietitian was because it allowed me to combine two of my favorite subjects – science and food. I loved digging into the science behind what we eat and how it impacts our health, and I also loved digging into a tasty plate of pasta that I had prepared.

This issue of Kernels also focuses on the scientific and the culinary side of wheat foods and grains. On the science side, we share the findings of a recent study from Harvard University, which shows that eating whole grains may extend your life. It all adds up to more reasons to eat that bowl of whole grain cereal at breakfast, munch a sandwich on whole grain bread at lunch, or serve your family whole grain pasta at dinner.

We also take a look at the recently-released Dietary Guidelines Advisory Committee (DGAC) report, and share our comments supporting the DGAC's continued call for half of all grain intake to come from whole grains. This recommendation allows Americans to reap the multiple, established health benefits of whole grains, leaving the other half of daily grain intake for enriched grain products, which have their own unique taste and nutritional benefits.

Turning to the culinary side, we highlight exciting new flavor trends for grain foods (think toast and toast flavors). Also trending are pies – move over cupcakes -- and what could be better for spring than tips and recipes featuring pies from sweet to savory and in between, because pies are not just for dessert anymore!

In our recipe spread, we highlight three of our newest recipes, developed specifically for the Wheat Foods Council around the themes of quick, healthy, and delicious.

We've even included a history lesson, taking a look back in time at what was on the "Meso" diet (as in Mesolithic) in what is now Great Britain.

So ponder the science, then get cooking in the kitchen and savor the recipes, because taste and nutrition really do go together.

Judi Adams

Judi Adams, MS RDN,
President, Wheat Foods Council

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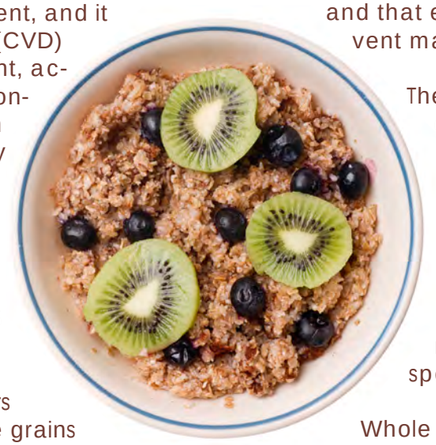
Welcome!

Eating Whole Grain Foods May Extend Your Life

Findings from a newly-released Harvard Study

Who knew that starting your day with a whole grain bowl of cereal or biting into your turkey and Swiss on whole wheat bread at lunch would help add years to your life? That's what a new Harvard research study has found.

Eating more whole grains is associated with lowering overall mortality up to 9 percent, and it lowered cardiovascular disease (CVD) -related mortality up to 15 percent, according to the long-term study conducted by the Harvard T.H. Chan School of Public Health. The study was published in the Journal of the American Medical Association in January 2015. Just one 28 gram serving of whole grain foods per day were responsible for lowering overall mortality by 5 percent and CVD by 9 percent.



Harvard scientists and researchers monitored consumption of whole grains for a large group of women and men and compared it with mortality data over an approximate 25-year period, adjusting for a variety of factors. While these are self-reported data, which has its limitations, conducting an intervention trial for over 118,000 individuals long term is both financially and logistically impossible. This study shows association and not cause and effect. In addition, according to the authors, the participants were predominantly middle-aged and older healthcare professionals of European ancestry, and it is unknown whether the findings can be generalized to other demographic or ethnic groups.

Assistant professor in the Department of Nutrition and senior author of the study, Qi Sun, stated that these findings "further endorse" current dietary guidelines promoting whole grains as a significant healthy food and that eating whole grain foods helps prevent major chronic diseases.

The Harvard study found that bran, a component of whole grain foods, was linked with up to 6 percent lower overall mortality and up to 20 percent lower CVD-related mortality.

Like all grains, wheat is grown from the seed or "kernel," and each kernel contains three parts - the endosperm, bran and germ.

Whole grain products contain the entire kernel of grain. As the study suggests, the bran provides optimal health benefits like insoluble fiber, B vitamins, trace minerals, and a small amount of protein. In addition, the germ supplies a rich source of trace minerals, unsaturated fats, B vitamins, antioxidants and phytochemicals.

Sources: Harvard T.H. Chan School of Public Health, press release, "More whole grains linked with lower mortality," January 5, 2015; Wheat Foods Council website.

Michele Tuttle, MPH, RD – One Grainy Athlete

Threes seem to be playing an important role in Michele Tuttle's life these days. As the mother of two children, a working registered dietitian, and a competitive, nationally-ranked athlete, she knows the importance of achieving balance between these three areas in her daily life.

She has also chosen to compete in a sport that involves three different events – the triathlon. A life-long athlete, she didn't decide to take on the rigors of being a triathlete until her mid-40s. She has competed at USA Triathlon (USAT) Nationals (Olympic and Sprint distances) and qualified for the 2013 World International Triathlon Union (ITU) Triathlon Championships in London. There, she won the bronze medal in the sprint distance and placed 8th in the Olympic distance. She's been a USAT All-American triathlete since 2012 and is currently certified as a USAT Level I Triathlon Coach and US Masters Swimming Coach (Level 2).

The Wheat Foods Council is pleased to announce its sponsorship of Michele this year, as she sets her sights on her next achievement – competing at the 2015 World ITU in Chicago in September. As part of its sponsorship, Michele will be featured on the WFC website **www.wheatfoods.org**, where both new and old fans will be able to follow her on social media (**@irongirlrd**), read her blog postings, learn about her training regimen including diet and the importance of grains in her training, and watch videos of her in action.

To help you get to know Michele better, Kernels interviewed her recently to find out more about what makes her run…and swim…and bike!

WFC: Why did you start competing as an adult? What motivates you?
I've always enjoyed having a goal or purpose. Although I love training and exercise, somehow it feels better to know that I'm going to "use" it for something. I started swimming competitively at age 13 and continued through college. After graduating from college, I would sign up for an event every now and then, usually a masters swim meet, at least once per year. Having a goal means you get up on those cold dark mornings and train when you'd rather stay in bed.

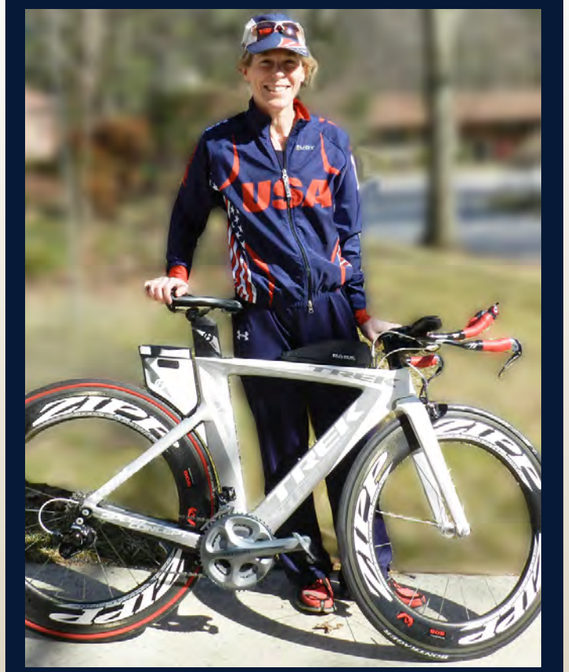
I think my biggest source of motivation for racing is simply the desire to see where my limits are, physically and mentally. People often say they race and train because they can. The older I get, the more I believe this. I do it because I can. So many people either cannot physically exercise because of health problems, or simply don't feel the payoff of exercise is worth the hassle or discomfort. For me, I've always had to do some form of physical activity to be able to function well in the rest of my life. I wouldn't say I'm "addicted" to exercise but I really don't feel good on the days I don't do some sort of activity. That makes it easy for me: it's sort of like brushing my teeth. I may be tired, but I do it anyway and am always glad I did.

WFC: Why triathlons?
I like a lot of variety in my life. Whether it's food or work or physical activity, I really like doing a lot of different things all the time. Triathlons require training in three different sports. At any one time, you might be feeling great in one sport and miserable in another but something good is usually going on in one of the three. Plus, I love all three sports. And, I love being outside. When you think about it, most kids love to swim, ride their bikes and run around. That's what triathlons are for me: playtime.

WFC: What do you like best – and least – about competing?
The best part about competing is the anticipation leading up to a race. You've put in all kinds of training and preparation but race day is always where it all has to come together. Things will go right and not so right. I love the feeling of knowing you've done everything you can to prepare and now it is sort of out of your hands. Your only job is to do what you can, moment by moment, as you race and deal with the inevitable things that come up that you didn't plan for (like the weather, a flat tire, a cramp or whatever).

I can honestly say that what I like least is that training hard means risking injury. Being injured is the WORST. It's like being sent to your room without dinner (does anyone do this anymore??)…you have to "rest" to get better which means you can't train.

WFC: How do you juggle a family, work and training?
First, I have the world's most supportive husband. He's willing to pick up the slack when I can't do something because of my training or work schedule. It also helps tremendously that I work from home.



It means I can structure my time to fit my training schedule. Since I don't commute, I have more time for training, work and family. Also, I try to do most of my training at times that don't impact our family time. At times, this means either getting to work really early (5:30 am) so I can work out mid-day, or squeezing workouts in between other activities. I won't say it's easy to balance the type of training I do with work and family responsibilities, but it is worth it to me.

WFC: What role do grains play in your diet? Why are they important?
I've always, always, always eaten a diet that features lots of grains. And, I've been a very active person my whole life. I get hungry every 2-3 hours no matter what I eat. For me, foods like cereals, breads, and pasta are staple foods. Of course, I eat other types of grains, too, and I eat whole grains as much as I can. But, I also include a lot of enriched grains because they're easy for me to eat and I like them. For me, grains are especially important because nutritionally, they supply the carbohydrate, iron and B vitamins that I need a lot of because of my training.

WFC: Share with us some sample menus (breakfast, lunch, dinner, snacks).
Typical Breakfast: whole grain cereal with skim milk and fruit, orange juice and coffee with half and half.

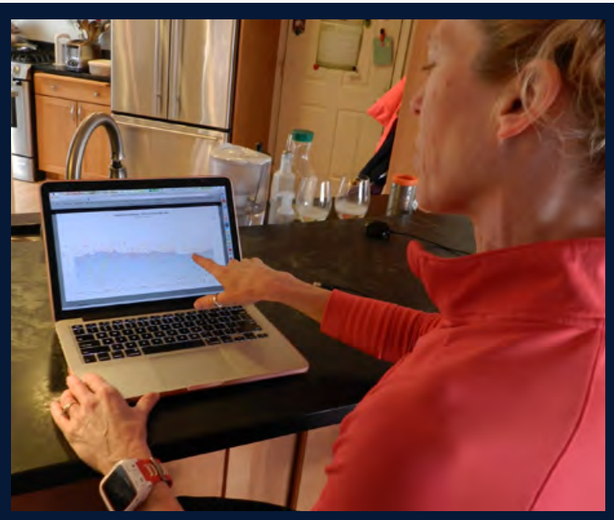
Mid-am Snack: handful of almonds and a kefir or yogurt based smoothie.

Lunch: Hearty soup or stew (leftover from dinner) that usually includes some pasta, beans, and lots of vegetables, or an omelet with spinach, onions, mushrooms and cheese with an English muffin.

Mid-pm Snack: Pretzels with peanut butter or corn chips with guacamole or hummus and pita chips. I'm also a big fan of Oreos and milk (shhhh…don't tell anyone).

Dinner: Hearty soup or stew made with beans, pasta, vegetables, and often beef, salad and bread. Another night might be something like chicken marsala with tons of mushrooms, served with sautéed spinach or steamed broccoli and pasta.

WFC: Most of us are not competitive athletes. Are there some key takeaways you can share that we can all do on a day-to-day basis to eat healthier?
I think the important thing is to set an intention toward what you are trying to achieve. If you want to eat healthier, you have to first be specific about what you are going to change, then come up with ways to make it happen. For example, if you are going to switch to a whole grain cereal, you need to make sure that cereal is available and that you like it. Next, it has to be placed where you are going to remember to eat it. And, if you normally skip breakfast because of time, you have to get up in time to eat or else make it possible to bring it with you. In other words, after you set an intention, you have to examine the barriers and work toward removing them.



Any Way You Slice It, Pie Comes Up Delicious

"As American as baseball and apple pie" -- Most Americans would agree that a slice of pie symbolizes one of life's simple pleasures. Pies are enjoyed by many at holiday meals, family gatherings, parties and summer picnics, and they're not just for dessert anymore.

Eighty percent of pie consumers eat pie at other times of day, including breakfast, according to an American Pie Council (APC) consumer survey conducted by the Nielsen Perishables Group in January 2014. The APC survey showed that more than half of respondents eat pie once per month, and the top three favorite pie flavors were apple, pumpkin and chocolate.

Next to Thanksgiving, Christmas is the most popular occasion to serve pies. Nearly 80 percent of people who eat pie have made one from scratch, and over half of cooks were taught by their mothers. Fifty-one percent will buy the pie crust, but make a homemade filling, according to the report.

The definition of pie is not agreed upon by all, but a pie must have a pastry, made with some form of grain, like wheat, combined with a fat and baked in some kind of container. Pies typically have a bottom crust, sometimes a top crust, with sides that encase the fillings.

Pies date back to the Egyptians, about 1300 B.C., where bakers combined fruits, nuts and honey in dough, similar to a galette. Ancient Greeks encased primitive dough comprised of flour and water around meats to hold in juices, but the Romans produced the first recipe, a rye-crusted goat cheese and honey pie.

During European medieval times, pies or "pyes," were primarily filled with savory meat and cheeses and baked in pans called "coffyns." The early colonists brought British recipes for "meat pies" to America and seasoned them with dried fruits and spices. Pumpkin pie was first introduced at the Pilgrim's second, not first, Thanksgiving in 1623, and it was during the American Revolution that the term "crust" was used.

During the 19th century, sweet fruit-filled pies and pastries flourished. Portable or hand-held pies like turnovers, empanadas, and calzones, perfectly encased individual portions in crust and were served by street vendors to working class people as a quick meal.

With today's on-the-go lifestyles, "hand-pies," the homemade or bakery version of the pop-tart, have become popular. Hand-pies come in all shapes - round or square, half-moons or triangles. Pies baked in cupcake molds called "cuppies" by some, are also a great way to make a more traditional pie while sized like a hand-held one. "Cuppies" can be topped with ingredients like fruit compote or crumbled cookies.

Commercial and home bakers are also baking 6-inch mini-pies. The smaller sized pies are more convenient for serving and transport, and they allow for customizing flavors, higher piecrust to filling ratio, and provide the perfect portion.

Pies are growing in popularity and continue to satisfy and delight. The American Pie Council, created to preserve America's pie heritage, has hosted the APC National Pie Championships® since 1995 where amateur, professional and commercial pie bakers compete to be the best in their categories. This year's competition took place in April in Orlando, FL. The group also designated and registered January 23rd as National Pie Day.

Some unusual pie recipes: **Chocolate Avocado Pie (Cakespy.com)**, made with a cookie crumb crust and a whipped cream or meringue topping, or **Old-Fashioned Sawdust Pie**, a recipe from the Loveless Café in Nashville, TN, which gets its name from the mixture of cookie crumbs, pecans and coconut that look like sawdust.

For your next gathering or family meal, try one of the Wheat Foods Council's tasty sweet or savory pie recipes, like **Creamy Almond Peach Pie** or **Broccoli Swiss Quiche with Whole Wheat Pie Crust**.

Sources:

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Going Grainular:

Great New Ways with Whole Wheat Foods

Wheat Berry and Wild Mushroom Soup with Whole-Wheat Pasta

Ingredient List:
1 cup uncooked wheat berries
2 cups boiling water
½ cup dried porcini or shitake mushrooms (about ¾ ounce)
½ cup finely chopped fresh parsley
3 garlic cloves, minced
1 ½ teaspoons olive oil
1 cup diced onion
4 carrots, sliced
6 cups reduced sodium chicken broth
½ cup white wine (or unsweetened apple juice can be substituted for wine)
1 tablespoon tomato paste
1 ½ cups cooked whole-wheat pasta such as penne
5 ounces fresh spinach
½ teaspoon salt
¼ teaspoon black pepper
6 tablespoons (1 ½ ounces) grated fresh Parmesan cheese

Directions:
Place wheat berries in a medium saucepan; cover with water to 2 inches above wheat berries. Bring to a boil; reduce heat, and cook, uncovered, 1 hour or until tender. Drain.

Combine 2 cups boiling water and mushrooms in a bowl; cover and let stand 30 minutes. Drain mushrooms, reserve soaking liquid. Discard mushroom stems; thinly slice mushroom caps.

Combine parsley and garlic; divide into 2 equal portions.

Heat olive oil in a large Dutch oven over medium-high heat. Add cooked wheat berries, mushrooms, ½ of parsley mixture, onion and carrots; sauté 5 minutes. Stir in reserved mushroom liquid, broth, wine and tomato paste; bring to a boil. Cover, reduce heat, and simmer 30 minutes. Add pasta, spinach, salt and pepper. Cook for 1 minute or until thoroughly heated. Stir in reserved parsley mixture. Spoon soup into bowls and top with cheese.

Servings: 8
Time Saver Tip: Cook extra wheat berries as directed in the recipe or they can be prepared following the brown rice directions in a rice cooker. Freeze for later use.
Calories/Serving: 231
Nutrition: One serving provides approximately: 13 g Protein, 35 g Carbohydrates, 7 g Fiber, 3.5 g Fat (1 g saturated), 4 mg Cholesterol, 50 mcg Folate, 4 mg Iron, 692 mg Sodium

Pasta with Tomato, Kalamata Olives and Arugula

Ingredient List:
2¼ cups chopped plum tomatoes
¼ cup chopped pitted Kalamata olives
1½ tablespoons olive oil
¼ teaspoon salt
¼ teaspoon ground black pepper
2 garlic cloves, minced
6 cups hot cooked whole-wheat fusilli or penne pasta
3 cups baby arugula
2 ounces shaved fresh pecorino Romano cheese

Directions:
Combine first 6 ingredients in a large bowl. Add hot pasta and arugula. Toss gently. Divide pasta mixture among 4 bowls, and sprinkle with cheese.

Servings: 4
***Time Saver Tip:** Cook the whole box of pasta according to package directions. Freeze the leftovers in a freezer bag, reheat for later use.
Calories/Serving: 386
Nutrition: One serving provides approximately: 14 g Protein, 45 g Carbohydrates, 6 g Fiber, 16 g Fat (3.5 g saturated), 15 mg Cholesterol, 25 mcg Folate, 2 mg Iron, 587 mg Sodium

Chicken, Kale, and Black Bean Quesadillas

Ingredient List:
1 poblano pepper
2 cups baby kale
2 tablespoons water
¼ teaspoon salt
1 cup rinsed and drained no-salt added canned black beans
4 (8 inch) whole-wheat flour tortillas
2 cups chopped or shredded cooked chicken (cooked leftovers or rotisserie chicken are options)
1½ cups (6 ounces) shredded Mexican Blend cheese

Directions:
Place poblano pepper on foil under broiler until skin blisters and darkens, about 5 minutes. Seal in foil until cool enough to handle -- about 5 minutes, remove skin, seeds and stem; dice.

Heat water in small skillet. Add kale and salt, stir until kale is wilted, remove from heat. Place ½ cup beans in a bowl; mash. Add remaining ½ cup beans, diced poblanos and kale; mix.

Divide bean mixture among tortillas, top with chicken and cheese. Fold each tortilla in half over filling and lightly coat with cooking spray (on both sides).

Heat skillet to medium heat. Add 2 quesadillas; cook until lightly browned on each side (about 2 minutes per side). Repeat with remaining quesadillas. Cut each quesadilla into 3 pieces.

Servings: 6 (2 pieces per serving)
Calories/Serving: 307
Nutrition: One serving provides approximately: 24 g Protein, 23 g Carbohydrates, 5 g Fiber, 14 g Fat (6 g saturated), 62 mg Cholesterol, 33 mcg Folate, 1.5 mg Iron, 499 mg Sodium

Grain Chain Supports Grain Recommendations In Dietary Report

The Grain Chain coalition, of which the Wheat Foods Council is a member, expressed its support for the Dietary Guidelines Advisory Committee's (DGAC) report recognition of the importance of whole grains in the diet in an oral statement delivered March 24, 2015.

Representing the Grain Chain at the public meeting with officials from the U.S. Department of Health & Human Services and U.S Department of Agriculture was Dr. Glenn Gaesser, PhD, professor at Arizona State University and director of the Healthy Lifestyles Research Center. Dr. Gaesser also serves on the WFC Advisory Board.

In the statement, Dr. Gaesser expressed strong agreement with the DGAC's continued call for half of all grain intake to come from whole grains. "This recommendation would allow Americans to reap the multiple, established health benefits of whole grains, leaving the other half of daily grain intake for enriched grain products, which have their own unique benefits," he said.

He pointed out that, as a category, grain foods contribute vital, and often under-consumed, nutrients to the American diet, including 44% of all fiber. In fact, he noted that a number of scientific

reports have demonstrated the distinctive benefits of cereal fiber compared to fiber from fruits and vegetables.

Referring to the terminology used in the DGAC report, Dr. Gaesser observed that staple grain products like white bread, pasta and tortillas, are placed in the same category as more indulgent refined options such as cake. Dr. Gaesser stressed that "enriched" is a more appropriate term to describe the grain products the average American sees in the grocery aisle.

"These staple foods contain some fiber and are enriched with important nutrients, like thiamin, niacin, riboflavin and iron. They are fortified with folic acid, which is essential for women of childbearing age to help prevent neural tube birth defects.

The rate of neural tube defects in the US has decreased by approximately one-third since the fortification of enriched grains began in 1998," he stated.

Dr. Gaesser further pointed out that the Committee's conclusions that higher consumption of "refined" grains is linked to higher risk of diabetes, cardiovascular disease and obesity are not consistent with a large body of scientific evidence and again, reflect the disconnect in how staple grain products are classified.

To support this statement, Dr. Gaesser referred to many studies not cited by the Committee which show:

- No association between refined/ enriched grain intake and diabetes risk or incident cardiovascular events;
- Little, if any, relationship between body mass index and refined/enriched grain intake; and
- Comparable effects of whole and enriched grains in facilitating weight loss.

Other members of the Grain Chain include the American Bakers Association, American Institute of Baking, Grain Foods Foundation, Grains for Health Foundation, Independent Bakers Association, National Association of Wheat Growers, National Pasta Association, North American Millers' Association, Retail Bakers of America, and USA Rice Federation. The coalition will also be filing formal written comments on the DGAC report with HHS and USDA later this spring.

Scientists have found evidence of wheat in Britain some 8000 years ago – about two thousand years before inhabitants actually grew their own wheat. The research, published in Science magazine, points to a sophisticated trading relationship between Mesolithic (the culture between Paleolithic and Neolithic) peoples previously considered relatively isolated and other, more advanced farming cultures across Europe.

The research is based on discovering the DNA of einkorn wheat, one of the first plants to be domesticated and cultivated, in sediment off the Isle of Wight that was once a peat bog next to a river. Scientists speculate that the wheat was brought there by traders, possibly using land bridges that connected the South East coast of Britain with the European mainland. The wheat may have been ground into flour to supplement the diet of the hunter-gatherers populating Britain at that time.

Co-researcher Professor Vincent Gaffney, of the University of Bradford, stressed the importance of the find in further illuminating a lesser-known period in British and European history. "It now seems likely that the hunter-gather societies of Britain, far from being isolated were part of extensive social networks that traded or exchanged exotic foodstuffs across much of Europe," he said.

WHAT'S TRENDING THIS YEAR:

Toast and Toast Flavors!

(And other hot trends for grain foods)

Every year the food and beverage industry takes the culinary pulse of consumers to find out what they are choosing to eat and drink, and why. The information forms the basis of the "Top Trends" lists announcing which products are "in" and which are "out" across a wide range of categories, including grain foods.

Toast, an interesting favorite this year, was listed as one of the top ten major influencers driving menu trends on The Flavor & The Menu magazine's annual Top 10 Trends for 2015.

However, this is not the traditional slice of whole wheat toast for breakfast, nor a crostini or open-faced sandwich. Toast – varieties of artisanal bread topped with a multitude of ingredients and spreads – is being featured as an individual menu item providing an alternative choice for different meal occasions on menus across the nation.

Evolving beyond the "hipster" cafes where it debuted last year in San Francisco's Bay Area, today's toast offers the simplicity and comfort of our beloved old favorite, in the form of thick slices of freshly-baked breads, perfectly crisped, and topped with a small concoction of ingredients, from savory bacon, cheddar and avocado to fresh fruit paired with honey or cinnamon butters – the sky is the limit.

"Toast" is also showing up as a flavor this year, reminiscent of what we make for breakfast, buttered to serve with eggs or sprinkled with cinnamon and sugar. The flavor was showcased during the January Winter Fancy Food Show in San Francisco, where buyers from supermarkets, delis and specialty markets sample new key food trends.

Some of the toast-flavored offerings included The Republic of Tea's "Cinnamon Toast HiCaf Tea" and B.T. McElrath Chocolatier's "Buttered Toast Chocolate Bar" with toasted breadcrumbs and the company's blend of cacao milk chocolate. San Diego-based Chuao Chocolatier offered their "Salted Chocolate Crunch," combining toasted crumbs with sea salt and dark chocolate.

Burnt toast is even being used as a spice! According to Saveur magazine's 2015 Top 100 list of the most unusual trends, Chefs Nick Balla and Cortney Burns of San Francisco's Bar Tartine, are using burnt bread as a spice. To prepare, grill slices of crusty, country-style bread until it is black and grind into powder. The powder – think charcoal dust - has a nutty, smoky flavor that compliments mixes, sauces, chicken and roasted vegetables, or even ice cream.

Other Trends for Grain Foods

Each year, the National Restaurant Association surveys chefs from the American Culinary Federation about food, cuisine, and theme trends.

Breakfast or brunch trends for 2015 include egg white sandwiches and breakfast burritos. Italian food and French toast were rated perennial favorites, while Americans continue their love affair with doughnuts, which climbed in popularity by 12 percent. Whole grain foods in kids meals ranked 14th on the Top 20 Food Trends for 2015 list, and for desserts, bite-size minis, savory desserts, and hybrid innovations, like croissant-doughnuts (cronuts) or townies (tartlet brownies), were the high on the list.

Last year, Parade Magazine partnered with the NPD Group, a market research company, to examine the eating habits and attitudes of 1,000 American men and women from every region of the country, then compared the answers with historical data from NPD. The resulting article, "What America Eats," reported some interesting trends for grain foods. For instance, people are sourcing more sandwiches from the grocery store freezer case, and 47 percent of breakfast meals ordered are sandwiches or wraps. Of the foods parents pack for kids' lunches, sandwiches remain king at 66 percent. Pizza topped the list as the number one fast food item ordered for dinner. The survey also found that healthier snacks like protein bars are gaining in popularity, up 14 percent, and savory snacks are more popular than sweet.

Sources:

Flavor & The Menu, press release, PRNewswire, 2015 Menu Trends, Jan. 15, 2015. **http://www.prnewswire.com/news-releases/brunch-ranch-dressing-and-italian-fast-casual-top-list-of-2015-menu-trends-300020998.html**

"Love/hate food trends (and where to find them)," by Emily Saladino, Special for USA TODAY, Oct. 7, 2014. **http://experience.usatoday.com/food-and-wine/story/news-festivals-events/2014/10/06/love-hate-food-trends/16824379/**

"A Toast Story," by John Gravois, Pacific Standard, Jan. 13, 2014., **http://www.psmag.com/health-and-behavior/toast-story-latest-artisanal-food-craze-72676**

Chuao Chocolatier website: **http://chuaochocolatier.com/chocolate-bars/bars/salted-chocolate-crunch.html**

B.T. McElrath Chocolatier website: **https://www.btmcelrath.com/product/buttered-toast-bar/**

"Toast is a flavor: Incredible food trends in 2015," by Elizabeth Weise, Jan. 13, 2015 USA Today/CNBC.com, **http://www.cnbc.com/id/102333254**

NPD Group partnered with Parade Magazine, survey/study about eating patterns; reported in the Parade Magazine article, "What America Eats," September 5, 2014., **http://communitytable.com/334779/parade/what-america-eats-our-exclusive-survey-on-the-nations-changing-tastes/**

The Saveur Top 100, "Burn Your Toast (on Purpose)," Jan. 21, 2015, **http://www.saveur.com/article/techniques/burn-your-toast-on-purpose**

The National Restaurant Association surveyed professional chefs, members of the American Culinary Federation, on which food, cuisines, beverages and culinary themes will be hot trends on restaurant menus in 2015., **http://www.restaurant.org/Downloads/PDFs/News-Research/WhatsHot2015-Results.pdf**

From:	Schaneman, Royce
To:	Wheat-Board, Intern
Subject:	FW: Whole Grains Summit 2015 - Early Registration Closing May 1, 2015
Date:	Tuesday, April 28, 2015 11:31:52 AM
Attachments:	image006.png

From: Gayle Veum [mailto:gveum@wheatfoods.org]
Sent: Monday, April 27, 2015 8:38 PM
To: gveum@wheatfoods.org
Cc: JAdams@wheatfoods.org
Subject: FW: Whole Grains Summit 2015 - Early Registration Closing May 1, 2015

As an event partner in the Whole Grains Summit 2015, we have been asked to share the following information with our WFC members. The early registration deadline is May 1, 2015.

Whole Grains Summit 2015

Whole Grains & Health: Empowering healthy change together

Crossing fields. Empowering communities. Harvesting Impact.

The Whole Grain Summit June 24-26, 2015 in Portland, OR

Register | Preliminary Program

The Whole Grains & Health Summit is nearly here! **Take advantage of early bird registration, which ends May 1, and register here today!**

This conference is for YOU, and we want to make it relevant, meaningful and worth the time you're committing to attend. Because the summit pulls together a broad range of participants and provides a format that allows for collaborative interaction, please take five minutes to share your thoughts in this brief survey, which will help provide a collective view of what's on the mind of the whole grain community. Even if you do not plan to attend the summit, we would love your opinions and insights.

There are many great reasons to attend, including a not-to-be-missed **Whole Grain Showcase Dinner on Friday, June 26**. Enjoy networking with summit attendees while celebrity chefs treat you to a dinner you will long remember. The owner of Paley's Place, Imperial and Portland Penny Diner, Chef Vitaly Paley, will join White House honoree Chef Garett Berdan, Natural Foods Chef Robin Asbell and Oregon State University Chef De Cuisine Jay Perry to bring their specialized knowledge and talents direct to your plate, offering a delicious and unique dining experience featuring whole grains. Remember, a ticket is required for this one-of-a-kind event. Learn more about these featured chefs and the night's menu online.

Upcoming Dates & Deadlines

May 1: Early Bird Registration Ends
June 4: the Nine's Hotel Block Deadline
June 10: Online Registration Closed
(Note: We encourage hotel reservations to be made as soon as possible, there are several large conferences in the Portland area that week.)

Hosted by Moore Family Center for Whole Grain Foods, Nutrition and Preventive Health and Grains For Health Foundation. For more information, visit wholegrainsummit2015.com. For questions about the conference contact moorefamilycenter@oregonstate.edu.

Moore Family Center for Whole Grain Foods, Nutrition & Preventive Health
College of Public Health & Human Sciences
212 Milam Hall, Oregon State University, Corvallis, OR 97331
MooreFamilyCenter@oregonstate.edu | Tel: 541-737-5205

From: Schaneman, Royce
To: Wheat-Board, Intern
Subject: FW: Wheat Field Day Saline County
Date: Monday, April 27, 2015 3:48:01 PM

From: Dipak Santra [mailto:dsantra2@unl.edu]
Sent: Wednesday, April 08, 2015 2:06 PM
To: P. Stephen Baenziger; Kriesel Seed; Larry Flohr; Jerry Radke; Von Johnson; Chris Cullan
Cc: Steven Knox; Schaneman, Royce; Greg Kruger; Robert Klein; Randy Peters; Randon Peters; Teshome Regassa
Subject: RE: Wheat Field Day Saline County

Here is the FINAL schedule for Panhandle Wheat Plot Tours:
Kimball Co.: June 23, 6 PM
Cheyenne Co at HPAL: June 24, 9 am
Box Butte Co (Irrigated Trial), Hemingford: June 24, 3 PM
Box Butte Co (Dryland Trial), Hemingford: June 24, 5 PM
Dipak

Dipak K. Santra, Ph.D.
Associate Professor and Alternative Crops Breeder
University of Nebraska-Lincoln
Panhandle Research and Extension Center
4502 Avenue I,
Scottsbluff, NE 69361
Ph: 308-632-1244

From: P. Stephen Baenziger [mailto:pstephen.baenziger@gmail.com]
Sent: Wednesday, April 08, 2015 10:11 AM
To: Kriesel Seed; Larry Flohr; Jerry Radke; Von Johnson; Chris Cullan
Cc: Steven Knox; Royce Schaneman; Dipak Santra; Greg Kruger; Robert Klein; Randy Peters; Randon Peters
Subject: Fwd: Wheat Field Day Saline County

Just a heads up on the Field days in western NE this year. The Grant Field day is June 23, so I hope to go from Grant to Kimball on June 23.

Thanks go to Dipak for getting this coordinated.

Stephen

---------- Forwarded message ----------
From: **Dipak Santra** <dsantra2@unl.edu>
Date: Wed, Apr 8, 2015 at 10:29 AM
Subject: RE: Wheat Field Day Saline County
To: Teshome Regassa <tregassa2@unl.edu>

Cc: "P. Stephen Baenziger" <pstephen.baenziger@gmail.com>, Randy Pryor <randy.pryor@unl.edu>, Stephen Wegulo <swegulo2@unl.edu>

Teshome,

June 23 late afternoon (5 or 6 pm) at Kimball Co
June 24: Morning at HPAL
June 24: 3 PM Box Butte Co Irri
June 24: 5 pm, Box Butte Co Dry

Specific time may change little bit. Otherwise, dates are fine.

dipak

Dipak K. Santra, Ph.D.
Associate Professor and Alternative Crops Breeder
University of Nebraska-Lincoln
Panhandle Research and Extension Center
4502 Avenue I,
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Ph: 308-632-1244

From: Teshome Regassa
Sent: Wednesday, April 08, 2015 9:19 AM
To: Dipak Santra
Cc: P. Stephen Baenziger; Randy Pryor; Stephen Wegulo

Subject: RE: Wheat Field Day Saline County

Dipak,

Not sure I followed the subsequent conversation to this one. Did you have the specific dates set for the wheat field days in the West?

Thanks

Teshome

From: Dipak Santra
Sent: Wednesday, April 01, 2015 10:12 PM
To: P. Stephen Baenziger; Randy Pryor; Teshome Regassa; Stephen Wegulo
Subject: RE: Wheat Field Day Saline County

Ok, Stephen. Let me check with the guy in Kimball and will finalize the date.

dipak

Dipak K. Santra, Ph.D.
Associate Professor and Alternative Crops Breeder
University of Nebraska-Lincoln
Panhandle Research and Extension Center
4502 Avenue I,
Scottsbluff, NE 69361
Ph: 308-632-1244

From: P. Stephen Baenziger [mailto:pstephen.baenziger@gmail.com]
Sent: Wednesday, April 01, 2015 9:11 PM
To: Dipak Santra; Randy Pryor; Teshome Regassa; Stephen Wegulo
Subject: Re: Wheat Field Day Saline County

Dipak:

Right now, both weeks are completely open for me. Not sure when the Saline Co one will be scheduled, but I can certainly work with everyone.

Stephen

On Wed, Apr 1, 2015 at 10:00 PM, Dipak Santra <dsantra2@unl.edu> wrote:

> Stephen,
>
> That is good idea. I will check with Kimball co-operator.
> I checked with Greg and he does not think that he will have wheat plot tour in Arapahoe this year.
> Therefore, he suggested to me to schedule tour in Panhandle according to your and my schedule.
> Which days of week of June 8-12 and 15-19 works best for you?
>
> Regards,
>
> dipak
>
> Dipak K. Santra, Ph.D.
> Associate Professor and Alternative Crops Breeder
> University of Nebraska-Lincoln
> Panhandle Research and Extension Center
> 4502 Avenue I,
> Scottsbluff, NE 69361
> Ph: 308-632-1244
>
> **From:** P. Stephen Baenziger [mailto:pstephen.baenziger@gmail.com]
> **Sent:** Wednesday, April 01, 2015 8:57 PM
> **To:** Dipak Santra
> **Cc:** Teshome Regassa; Paul Hay; Randy Pryor

Subject: Re: Wheat Field Day Saline County

Dear Dipak:

As of now, I think I can work with your schedule. I will definitely be with you for Sidney and Alliance. Not sure about Stateline. I recommend talking to whomever does the Kimball trial to see what their thoughts are. Always good to have a consensus rather just make a decision in case they complain.

Best wishes,

Stephen

On Tue, Mar 31, 2015 at 11:48 AM, Dipak Santra <dsantra2@unl.edu> wrote:

> Stephen,
>
> Field day in the west is not scheduled. I responded in my earlier mail that either week of June 8-12 or 15-18 are open for me. As usual, One day for Sidney (am) and Alliance (pm). I am wondering if you will be able to make one day at Stateline site in Goshen Co. May in the evening of your day of arrival. My other site is at Kimball Co. and I do not see any reason to have a plot tour there.
>
> Dipak
>
> Dipak K. Santra, Ph.D.
> Associate Professor and Alternative Crops Breeder
> University of Nebraska-Lincoln
> Panhandle Research and Extension Center
> 4502 Avenue I,
> Scottsbluff, NE 69361
> Ph: 308-632-1244
>
> **From:** P. Stephen Baenziger [mailto:pstephen.baenziger@gmail.com]
> **Sent:** Monday, March 30, 2015 8:06 PM
> **To:** Randy Pryor; Dipak Santra
> **Cc:** Teshome Regassa; Paul Hay
>
> **Subject:** Re: Wheat Field Day Saline County
>
> I am not sure when the western field day are--may have lost them in the email string. How would the week of June 15 work. The Stumpf field day is June 23, so it woudl fit nicely if the Sidney and Alliance field days were on June 24 if the dates has not already been set.
>
> Just a thought.
>
> Stephen

On Mon, Mar 30, 2015 at 9:02 PM, Randy Pryor <randy.pryor@unl.edu> wrote:

I and Paul Hay will be gone from June 5 to 15. How about a different set of dates?

Randy

From: P. Stephen Baenziger [mailto:pstephen.baenziger@gmail.com]
Sent: Monday, March 30, 2015 7:53 PM
To: Teshome Regassa
Cc: Randy Pryor; Stephen N Wegulo

Subject: Re: Wheat Field Day Saline County

How does the week of June 8th work for everyone?

Stephen

On Mon, Mar 30, 2015 at 3:23 PM, Teshome Regassa <tregassa2@unl.edu> wrote:

Stephen and Stephen,

Please see below Randy's comment regarding wheat field day in the east. Is there a date you will like to suggest?

Thank you

Teshome

From: Randy Pryor
Sent: Monday, March 30, 2015 2:58 PM
To: Teshome Regassa
Cc: P. Stephen Baenziger; Stephen N Wegulo
Subject: Re: Wheat Field Day Saline County

I am gone to Washington DC on a 4-H trip June 5 thru 15. Available after that. When were you thinking in relation to tours in the west? We will need to check Dr. Baenziger and Stephen Wegulos schedules. This note should help get the ball rolling to respond back to us from this email.

Randy

Sent from my iPad

On Mar 30, 2015, at 1:46 PM, "Teshome Regassa" <tregassa2@unl.edu> wrote:

<image001.gif>
Hello Randy,

When do you like to host the wheat field day?

Thank you

Teshome

Teshome H. Regassa, Ph.D.
Research Assistant Professor &
Daugherty Water for Food Institute Faculty Fellow
University of Nebraska-Lincoln
Dept. of Agronomy and Horticulture
175 Keim Hall, Lincoln,NE 68583-0915
Phone (402) 472 1489
email tregassa2@unl.edu
UNL Variety Testing Home

"When you cease to dream, you cease to live." M.S. Forbes

--
P. Stephen Baenziger
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Office: 402-472-1538
Fax: 402-472-7904
http://agronomy.unl.edu/grain/

From:	Schaneman, Royce
To:	Wheat-Board, Intern
Subject:	FW: Wheat Sculpture & Reading Rail at Raising Nebraska
Date:	Monday, April 27, 2015 10:44:35 AM

Funding Proposal

-----Original Message-----
From: David Buchholz [mailto:dave@teamdavid.com]
Sent: Tuesday, March 10, 2015 6:45 AM
To: Brauer, Caroline; Schaneman, Royce
Cc: Stuart Shepherd
Subject: Wheat Sculpture & Reading Rail at Raising Nebraska

Wheat Team:

As you know, our original design for Raising Nebraska included large realistic sculptures of Nebraska's primary commodities‹wheat among them.

For the launch, we were able to secure funding for sculptures of corn and soybeans (see attached soybean photo)‹along with informative reading rails around each sculpture which included three flip books and one interactive touch screen display.

For wheat (and other commodities such as sorghum, dry edible beans, etc) we developed a series of 8 x 12 freestanding banners as our "stop gap"
solution. But our vision is to complete the series of large sculptures in the space.

Circling back with you to see how we might go about securing funding support for the creation of an amplified presence for wheat in the Raising Nebraska space‹either from the Nebraska Wheat Board, private industry or a combination of both.

The underwriting cost for this project, including overall concept and design, sculpture development, reading rail design, content and construction, content development, flip book development and production, interactive touchscreen development and installation, creative/design services, shipping and installation is $150,000.

The wheat sculpture would be over 13 feet high and more than 9 feet wide.

Caroline mentioned that you have a board meeting this week, so I wanted to get something in front of you‹although this is not the most "formal" of proposals.

While I realize this amount is likely a bit pricey for the NWB alone, I would like to talk with you about finding other potential funding sources such as your industry partners and others who might see value in telling the wheat story in this international award-winning experience.

Please let me know if you have any questions or would like more information at this time.

Thanks so much for your partnership on this project to date. Hoping we can work together to find ways to tell the wheat story in even more compelling ways!

DAVE BUCHHOLZ
David & Associates
402.469.8044

IMPROVING WHEAT VARIETIES FOR NEBRASKA

2014 STATE BREEDING AND QUALITY EVALUATION REPORT

Report to the

NEBRASKA WHEAT DEVELOPMENT, UTILIZATION
AND MARKETING BOARD

P. S. Baenziger, Devin Rose, Dipak Santra, Mary Guttieri, and Lan Xu

Key Support Staff:
Mitch Montgomery, Gregory Dorn, Richard Little,
Janelle Counsell Millhouse, Marc Walter, and Vern Florke

Graduate Students, Visiting Scientists, and Postdoctoral Scientists:
Ibrahim Salah El-Basyoni, Juthamas Fakthongphan, Katherine Frels, Rungravee Boontung, Golnaz Komaei, Tadele Tadessa Kumssa, Nick Garst, Amanda Easterly, Caixia Liu, Waseem Hussain, and Santosh Rajput

Key University of Nebraska Cooperators:
Kent Eskridge, Stephen Wegulo, Ismail Dweikat, Teshome Regassa, Tom Clemente, Jeff Bradshaw, Greg Kruger, Shirley Sato, Gary Hein, Aaron Lorenz, Brian Waters, Harkamal Walia, Brian Wardlow, Bryan Leavitt, and Richard Perk

Key Cooperators:
USDA-ARS
Robert Graybosch, Lori Divis, Ming Chen, Brad Seabourn, Richard Chen,
Rob Mitchell, Yue Jin, Matthew Rouse, Steven Xu, Robert Bowden, Guihua Bai, and Satyanarayana Tatineni.

Public Universities:
Amir Ibrahim and Jackie Rudd (TAMU); Pat Byrne and Scott Haley (CSU); Brian Arnall, Liuling Yan, and Brett Carver (OSU); Gurong Zhang, Jesse Poland, and Alan Fritz (KSU),
Sunish Sehgal (SDSU), Jerry Nachtman (U of WY), and G. F. Marais and Zhaohui Liu (NDSU)

March 2015

2014 STATE BREEDING AND QUALITY EVALUATION REPORT

I. INTRODUCTION

Development research on Nebraska's wheat varieties is a cooperative effort between the Agricultural Research Division, IANR of the University of Nebraska-Lincoln, and the Agricultural Research Service/USDA, Northern Plains Area. Winter wheat breeding, which includes variety, line, and germplasm development, is a major component of the state's wheat improvement research. This report deals only with the state portion of the total wheat breeding effort (located in the Department of Agronomy and Horticulture at the University of Nebraska-Lincoln). Very important contributions come from state and federal researchers and from Nebraska research and extension centers, as well as from state and private researchers in South Dakota, Wyoming, Kansas, Oklahoma, Texas, and Colorado. Other important contributions come from researchers in the Department of Plant Pathology (both state and federal); plant pathologists located at the USDA Cereal Disease Laboratory in St. Paul, MN, and USDA entomologists in Manhattan, KS and Stillwater, OK. All of these programs invest time and funds into this program. Grants from the Nebraska Wheat Development, Utilization and Marketing Board, provide key financial support for this research. Without the Wheat Board's support, much of the state breeding efforts would be curtailed and many of the wheat quality analyses to evaluate our breeding material would not be available.

II. THE 2013-2014 NEBRASKA WHEAT CROP

1. Growing Conditions

The 2013-2014 growing season began with adequate moisture in most parts of the state. Adequate moisture continued for most of the state, but the southwest and west continued to have drought conditions in early spring. Overall, the temperatures were near normal and the season was considered close to average. Towards the end of the season, most of the crop had adequate to surplus moisture and those plants not injured early by the sporadic drought did very well. Overall, many wheat fields were very short due to the drought, but finished extremely well due to late rains.

2. Diseases

In 2014, drier-than-normal weather and cool temperatures early in the growing season delayed development of foliar fungal diseases. In addition, the amount of rust spores blowing in from southern states was small. As a result, foliar fungal disease levels were generally low during most of the growing season. Leaf rust arrived in mid-June in south-central and southeastern Nebraska, which was much later than its normal arrival time of mid- to late May. Statewide, levels of leaf rust were low. Other fungal diseases observed during the 2014 growing season included loose smut, common bunt, tan spot, Septoria tritici blotch, powdery mildew, and trace levels of Fusarium head blight (scab). Bacterial streak, also known as black chaff when it affects heads of wheat and other small grains, was the predominant disease in the eastern half of the state. At the Agricultural Research and Development Center (ARDC) near Mead and at Havelock Research Farm in Lincoln, very severe levels of bacterial streak were observed in wheat, oats, and triticale in breeding nurseries. Wheat soilborne mosaic virus (WSBMV) occurred sporadically in southeast Nebraska early in the growing season, but at much lower levels than in 2013. As temperatures warmed, symptoms of wheat streak mosaic virus (WSMV) and Triticum mosaic virus (TriMV) became more noticeable. Levels of virus diseases were generally low except in two fields in the southern Panhandle where high incidence and severity of WSMV were observed in June. Freeze injury was observed in some wheat fields throughout the state, but it was not as extensive as that observed in 2013. Drs. Stephen Wegulo (plant pathologist), Jeff Bradshaw and Gary Hein

(entomologists monitoring insect vectors of disease), and Satyanarayana Tatineni (USDA-ARS virologist) continue to be invaluable in disease identification, survey, and understanding.

3. Insects

Nebraska continues to have small outbreaks of Hessian fly and the diseases vectored by aphids or mites (specifically WSMV - and the other mite-transmitted viruses and barley-yellow dwarf virus). However, the major concern remains the continued spread of wheat stem sawfly into Nebraska. This is an emerging pest and currently the most used resistance mechanism is through plant breeding (solid stem lines), which carries a yield drag. Hence, in collaboration with Montana State University and Colorado State University, we are looking for novel resistance genes and mechanisms. Unfortunately, breeding for this insect pest will require more time and resources in the future. We are past the stage of wondering if it will come and find a home in Nebraska. The Entomology Program at the UNL Panhandle Research and Extension Center continues to work with the UNL Wheat Breeding Program to evaluate existing and new sources of resistance. Our 2014 Wheat Stem Sawfly Survey shows a continued geographic expansion into Nebraska (Table 1). We have recorded several individual field locations with as high as 100% infestation within the sampled area. Survey efforts were expanded in 2014 to more sites across different counties in Nebraska.

Table 1. Mean proportion infested stems and number of fields sampled (in parenthesis) of wheat stem sawfly larvae from 2011-2014 in Nebraska and select adjacent Colorado and Wyoming counties. Means are based on 25 subsamples of 100 total wheat tillers randomly collected from field edges for each location (99 site years).

State	County	2011	2012	2013	2014
Colorado	Logan	--	0 (1)	0.3 (1)	0.8 (1)
	Sedgewick	--	0 (1)	0 (1)	--
Nebraska	Banner	7.6 (7)	13.3 (6)	13.1 (3)	21.8 (1)
	Box Butte	3.5 (6)	9.2 (4)	18.1 (4)	23.8 (1)
	Chase	--	--	--	0 (1)
	Cheyenne	2.8 (4)	12.3 (1)	15.5 (1)	19.3 (1)
	Dawes	--	7.5 (1)	7.5 (1)	13.8 (1)
	Deuel	--	0 (1)	--	--
	Franklin	0 (2)	0 (2)	0 (1)	--
	Garden	0.3 (1)	0.3 (1)	0 (1)	1.5 (1)
	Gosper	0 (2)	0 (2)	0 (2)	0 (2)
	Harlan	--	--	--	0 (1)
	Kearney	--	--	0 (1)	--
	Kimball	--	--	--	1.8 (1)
	Morrill	5.1 (2)	6.8 (2)	22.1 (2)	18.3 (1)
	Perkins	--	--	--	0 (1)
	Scotts Bluff	--	14.5 (3)	13.9 (4)	20.8 (1)
	Sheridan	0 (2)	0.2 (3)	3.5 (2)	1.3 (1)
	Sioux	--	0.5 (1)	--	0 (1)
Wyoming	Laramie	8.1 (2)	11.9 (2)	21 (2)	--

Work is underway to develop a laboratory colony of stem sawfly that could greatly expedite our cultivar

evaluation timeline. Current stem sawfly resistant traits rely on solid stem traits for resistance. However, recent data from Nebraska (Table 2) indicate some variability in this trait between localities. This variability may in turn influence the reliability of this trait for stem sawfly resistance. Pith expression in wheat is somewhat determined by light intensity during development; therefore, it can vary accordingly. Montana has also noted this variability across its landscape as well.

Table 2. Mean (±SEM) wheat pith solidness ratings for select wheat varieties from State Variety Test Plots from three Nebraska counties. Ratings are from 5-25; where 5 = hollow and 25 = solid. Means based on 3 stems from five plants from four replicate plots per location. Varieties with an asterisk are generally referred to as "solid stem" varieties.

Variety	Deuel	Cheyenne	Dawes
Freeman	8±0.65	10±0.77	7±0.67
Warhorse*	19±1.08	25±0.17	18±1.31
Judee*	17±0.93	24±0.14	18±0.34
Bearpaw*	21±0.87	23±0.42	18±0.89
Pronghorn	6±0.3	8±0.74	6±0.66
Goodstreak	6±0.12	8±0.59	6±0.43
Hatcher	7±0.29	8±0.66	6±0.53

Lastly, for 2013 and 2014 we conducted a cage-infestation variety screen test (Table 3, "Cage") and evaluation of stem sawfly larval infestation in the Box Butte County State Variety Test (Table 3, "Field") for select varieties. All wheat varieties can become infested with the wheat stem sawfly (including solid stem varieties). However, mortality factors such as beneficial organisms and host-plant traits can limit the ability for a sawfly larva to complete development into a prepupa and eventually an adult wasp. Both variables (infestation and larval survival) are key to understanding both mechanisms of host plant resistance and the integration of these traits into the agricultural ecosystem. In our "cage" studies, a limited number of stem sawflies are introduced into cages containing a few varieties. In our "Field" study, natural populations (usually much larger number than our "cage" study) have access to a large number of varieties (many more than we sample). Therefore, in both studies, sawflies adults can make a choice as to where they deposit their eggs, but on much different land areas. It is clear from both studies that the solid-stem varieties (Bearpaw, Judee, and Warhorse) significantly reduce the survival of the wheat stem sawfly compared to many (but not all) hollow-stem varieties. In 2014, based on both "Cage" and "Field" studies, the wheat variety Warhorse had 0-9% stem sawfly survival and appears to be the most resistant of the wheat varieties we have tested thus far. It may also be noteworthy that some conventional hollow-stem varieties (e.g., Goodstreak) may have either a high stem sawfly mortality or a reduced insect preference. Lastly, in 2014, we included two barley varieties (Sidney and Stoneham – both are Russian wheat aphid resistant) to evaluate their susceptibility to stem sawfly. Neither barley variety had any evidence of infestation. Therefore, we are working with the UNL Wheat Breeding Program to evaluate some conventional wheat-barley crosses for potential novel sources

of stem sawfly resistance.**Table 3. Mean percentage (±SEM) of wheat tillers with wheat stem sawfly frass (Infest) or with live larvae or prepupae (Larvae) for select winter wheat varieties and two barleys* for artificially-infested, common-garden plots (Cage) or from the Box Butte State Variety Trial (Field). Different letters between means within a column in a study indicate a significant difference at p-val < 0.05.**

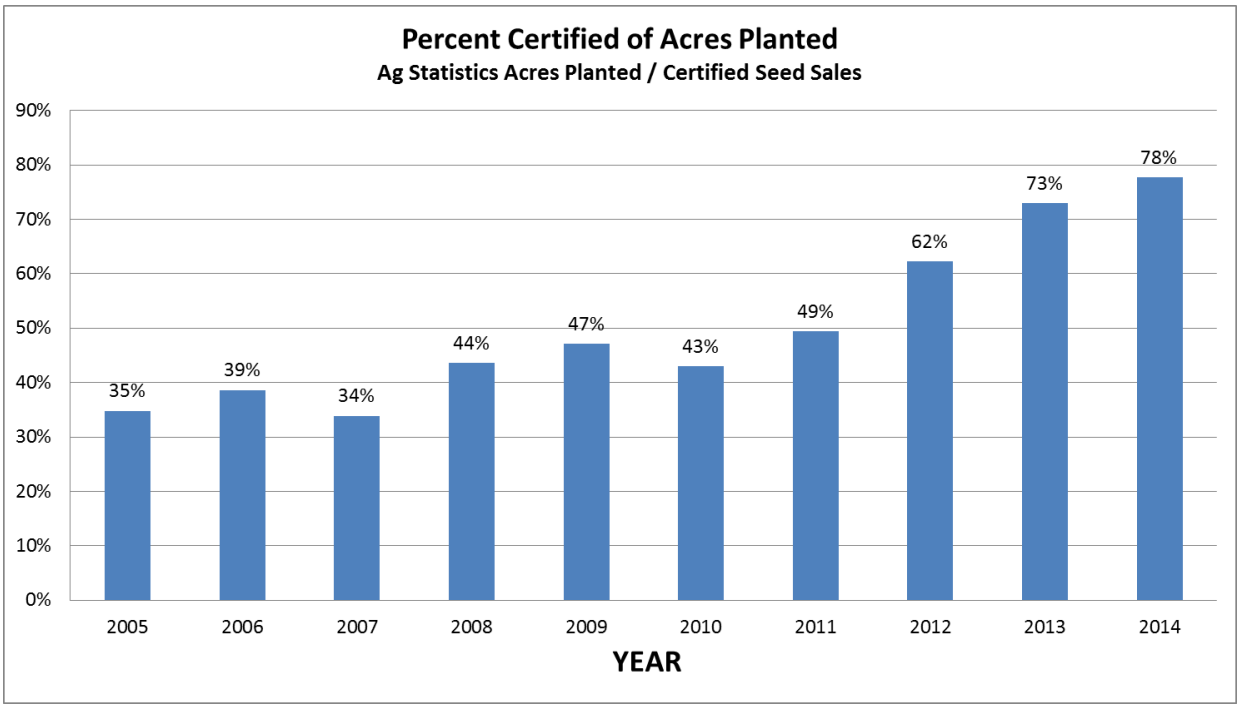
		2013		2014	
Cage	Variety	Infest (%)	Larvae (%)	Infest (%)	Larvae (%)
	Bearpaw	29.4 ± 0.2	7.1 ± 0.1	14 ± 0.1cd	8.7 ± 0.1cd
	Freeman	42.3 ± 0.25	4.2 ± 0.05	51.1 ± 0.2a	18.2 ± 0.05abc
	Goodstreak	23.6 ± 0.1	0 ± 0	9.6 ± 0.05cd	1.5 ± 0.05d
	Hatcher	37 ± 0.15	29.9 ± 0.15	33.2 ± 0.05ab	26.1 ± 0.1a
	Judee	17.3 ± 0.2	1.9 ± 0.05	6.9 ± 0.05d	4.4 ± 0.05d
	Kharkof	39.6 ± 0.25	8.3 ± 0.1	6.3 ± 0.05d	4.8 ± 0.05d
	Overland	32.7 ± 0.2	14.9 ± 0.15	26 ± 0.1bc	11.5 ± 0.1bcd
	Pronghorn	22.3 ± 0.15	10.9 ± 0.1	34.6 ± 0.05ab	21.5 ± 0.05ab
	Robidoux	20 ± 0.15	0 ± 0	9.6 ± 0.1cd	3.8 ± 0.05d
	Sidney*	--	--	0 ± 0d	0 ± 0d
	Stoneham*	--	--	0 ± 0d	0 ± 0d
	Turkey	--	--	11.1 ± 0.05cd	7.9 ± 0.05cd
	Warhorse	--	--	4.2 ± 0.05d	0 ± 0d
Field	Variety	Infest (%)	Larvae (%)	Infest (%)	Larvae (%)
	Bearpaw	--	--	38.7 ± 0.1d	18 ± 0.1de
	Freeman	36 ± 0.1c	2 ± 0.05d	63.3 ± 0.1c	29.3 ± 0.1bcd
	Goodstreak	42 ± 0.1c	20 ± 0.1bc	58.7 ± 0.1c	36 ± 0.1b
	Hatcher	61.5 ± 0.05ab	38.5 ± 0.1a	78.7 ± 0.05ab	52.7 ± 0.05a
	Judee	--	--	62.7 ± 0.05c	26 ± 0.05bcd
	NE09521	39 ± 0.1c	17 ± 0.1bcd	65.3 ± 0.1c	38 ± 0.1b
	Overland	72 ± 0.1a	34 ± 0.15ab	86.7 ± 0.05a	60.7 ± 0.1a
	Pronghorn	50 ± 0.1bc	7.5 ± 0.05cd	55.3 ± 0.1c	22.7 ± 0.1cd
	Robidoux	70 ± 0.1a	37.5 ± 0.1a	67.3 ± 0.05bc	36.7 ± 0.1b
	Turkey	48 ± 0.1bc	27 ± 0.1ab	60.7 ± 0.05c	33.3 ± 0.05bc
	Warhorse	--	--	28.7 ± 0.1d	9.3 ± 0.05e

4. Wheat Production

In 2013-2014 season, Nebraskans planted1,550,500 acres of wheat and harvested 1,450,000 acres with an average yield of 49 bushels/acre for a total production of 71,050,000 bu. This production was almost 180% higher than the 2012-2013 crop, which bodes well for wheat producers. In 2012-2013 season, 1,470,000 acres of wheat were planted in Nebraska and 1,130,000 were harvested with an average yield of 35 bu/a for a total production of 39,550,000 bu. The 2012-2013 crop was one of the smallest crops in the last 50 years and certainly highlighted the effect of drought. In 2012, 1,380,000 acres of wheat were planted in Nebraska and 1,300,000 were harvested with an average yield of 41 bu/a for a total production of 53,300,000 bu. Despite continued genetic improvement, the main determinant in wheat production seems to be acres harvested, government programs, the price of corn, and weather (which also affects disease pressure and sprouting). This is an economic reality in understanding wheat yields and productivity in Nebraska.

5. Cultivar Distribution

Nebraska did not take a variety survey in 2014, but has resumed the survey in 2015 (which has not been reported yet). In 2014, Settler CL (a one-gene Clearfield wheat) had the most reported acres of production followed by Overland, then Brawl CL+ (a two-gene Clearfield wheat), then Robidoux, Byrd, and Infinity CL (a one-gene Clearfield wheat). As Clearfield wheats require 100% certified seed planted every year, the total acreage of a variety within the state may be more for non-Clearfield wheat varieties that have some growers' planting back their harvested seed. It should be noted that many commercial lines do not report their seed production for proprietary reasons, so without the survey, it is impossible to know how much of those varieties are produced within the state. One important aspect is that using a "back of the envelope approach," the Nebraska Crop Improvement Association (NCIA), which has full access to certified seed production records, estimated that enough seed was produced in Nebraska to plant 78% of our wheat acreage. Nebraska has been a leader for planting certified seed, but this is major change since 1986 when approximately 25% of the wheat acres were sown to certified seed. In 2012-2013, using seed sales of certified seed, the top 10 lines were: Settler CL (15.4%), Overland (12.4%), Tam 111 (9.4%), AP502CL2 (6.3%), Winterhawk (5.6%), Wesley (5.1%), Pronghorn (5.0%), Infinity CL (4.3%), Art (3.6%), and Camelot (3.3%). In 2012, TAM 111 (12.8%) inched ahead of Overland (12.7%) as the most widely grown wheat cultivar in Nebraska, followed by Pronghorn (9.6%). Pronghorn and Goodstreak (5.1%) are tall (conventional height) wheat varieties that have consistently done well in the drought prone areas of western Nebraska. Buckskin (4.7%) decreased slightly, indicating that tall wheats, which are adapted to drought in the west, remain very popular (19.4% of the total state acreage).



While no wheat listed below has all of the characteristics of an ideal wheat, the diverse wheat varieties provide the grower an opportunity to choose high yielding, high quality wheat varieties that have resistance or tolerance to the diseases or insects prevalent in his or her region. Cultivars developed by the University of Nebraska wheat improvement program occupied 65.6% of the state acreage in 2012. Other public varieties occupied 17.4% (largely due to TAM 111) and private varieties occupied 17.0% (note the private cultivars do not include TAM 111 which was developed by Texas A&M but is marketed by Agripro) of the state acreage.

What is interesting is that no variety dominated the acreage. Variety diversity is useful, as it should reduce genetic vulnerability to disease and insect pests.

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Variety	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
2137	10.3	7.8	4.3	**3.5**	1.4	2.1	1.7			
2145				**1.0**	1.2	2.2				
Above				**1.3**						
Agripro Abilene	1.4	1.7	1.7		1.0					
Agripro Art								2.4	4.3	3.6
AgriPro AAP503 CL										1.1
AgriPro Dumas					1.4	1.2				
Agripro Hawken							1.2	2.1		
Agripro Jagalene		4.5	16.8	**23.8**	33.4	20.9	13.8	8.5	5.4	2.4
Agripro Ogallala	3.6	2.4	2.0	**1.4**	1.0	1.1				
Agripro Postrock						1.1	4.1	4.4	3.3	2.4
Agripro Thunderbird	1.8									
Agripro Thunderbird								1.1		
Agripro Thunderbolt	2.0	3.0	1.9	**1.9**	2.0	2.4	1.6	1.5	2.2	
Akron	1.2									
Alliance	11.5	13.6	10.1	**10.1**	7.2	6.1	6.1	6.0	3.9	3.7
Arapahoe	8.7	6.8	5.2	**2.9**	2.0	3.4	2.2	2.1	1.5	
Armour									1	2.6
Bond CL										1.1
Buckskin	7.3	4.9	3.7	**5.0**	3.5	3.4	3.3	4.5	5.9	4.7
Camelot									1.1	2.3
Centura	1.8	2.1	2.4	**1.9**	1.3	1.0				
Culver	2.5									
Goodstreak			1.7	**3.7**	3.6	5.1	5.0	6.5	4.4	5.1
Hatcher							1.2	1.5	1.8	2.1
Hawken									1.5	
Infinity CL						2.3	3.5	3.7	3.3	4.3
Jagger	3.9	2.8	3.1	**2.5**	1.7	1.5	1.1			
Karl/Karl 92	3.8	3.3	2.7	**2.7**	1.6	2.9	2.5	1.6	2.1	1.4
Millennium	6.1	11.1	10.7	**9.5**	7.2	9.4	13.2	11.9	7.6	5.9
Niobrara	5.4	3.5	2.2							
Overland							3.4	5.6	10.8	12.7
Overly					1.0	1.1				
Platte	1.0	1.3	1.6							
Pronghorn	10.3	10.4	11.4	**10.1**	12.2	10.6	12.1	13.7	10.4	9.6
Scout & Scout 66	1.1									
Settler CL										4.7
Siouxland	1.4									
TAM 111				**1.2**	1.6	3.2	6.5	7.4	8.1	12.8
TAM 112									1.2	
Vista	1.2									
Wahoo	1.8	1.7	1.8	**1.8**	1.1	1.5	1.1			
Wesley	3.6	5.9	5.5	**5.8**	7.2	7.7	4.8	4.1	4.2	2.0
Winterhawk									1.3	3
Z Other Private Varieties	3.4	4.4	4.0	**3.8**	2.8	4.1	5.0	3.6	5.4	4.5

Z Other Public Varieties	4.9	8.8	7.2	**6.1**	4.6	5.7	6.6	7.8	9.3	8.0
Total	100	100	100	**100**	100	100	100	100	100	100

6. New Cultivars

Based upon seed producers' input, the line NE05548 was recommended for release and formally released in January 27, 2014, as Husker Genetics Brand Panhandle. It was described in our previous annual report (available at: http://agronomy.unl.edu/documents/4128273/6410994/WheatAnnualReport2013.pdf) and will not be described here. In our work on nitrogen use efficiency (NUE) and mineral content in wheat (part of the TCAP project), we identified Panhandle as being a low Cd accumulating line. Cd is a toxic element and regulated in food. We also discovered that Freeman, the release before Panhandle is very good for NUE. It scavenges N better than other commercial cultivars. No other wheat line was recommended for release in 2014 though one line was recommended for licensing to our organic wheat community (NW07505, see below).

III. FIELD RESEARCH

1. Increase of New Experimental Lines

A number of lines are under increase for possible release in 2015 or 2016. NW07505 is a hard white semi-dwarf wheat that is derived from the cross Trego/Thunderbolt. It segregates for resistance to stem rust, is moderate resistant to leaf rust and wheat soilborne mosaic virus (or use abbreviation WSMV). It is moderately susceptible to stripe rust and susceptible to hessian fly, greenbug, black point, and barley yellow dwarf virus. In years when common bunt (stinking smut) was present in our organic tests, NW07505 was generally bunt free, indicating it is more resistant (based on data so far) to common bunt than many other lines we tested under organic conditions. One of its attributes is that it has above average quality at low protein levels. In organic production systems, it is often difficult to grow high protein lines, so having good end-use quality under organic production systems is very important.

NE07531 is derived from the cross HBA142A/HBZ//Ale (=HBK0630-4-5)/3/NE98574 (=CO850267/Rawhide)/4/Hallam. The HB... lines were gifted to Kansas State University by Pioneer when Pioneer reduced its hard red winter wheat breeding effort. NE07531 seems best suited for south central and southwestern Nebraska, as well as potentially irrigated production in western Nebraska. It is moderately resistant to stem, leaf, and stripe rust, WSBMV , and acid soils. It has some tolerance to Fusarium head blight. It is susceptible to wheat streak and triticum mosaic virus, and Hessian fly.

NE09517 is derived from the cross Jagger/Thunderbolt//Jagalene. NE09517 seems best suited for central to western Nebraska. It is resistant to stem rust, moderately resistant to stripe rust, and moderately susceptible to leaf rust. It is susceptible to barley yellow dwarf virus, WSBMV, Septoria tritici, and bacterial leaf streak, Hessian fly, and acid soils.

NE09521 is derived from the cross OK96717-99-6755/NI01824//NE00564 where the pedigree of OK96717-99-6755 is Abilene/2180//Chisholm, the pedigree of NI01824 is Intensivnaja/NE92458 (=PL83201/Redland)//VBF0168), and the pedigree of NE00564 is T81/NE91635 (=NE82671/NE82599). NE09521 is a moderately early, relatively tall, semi-dwarf wheat with average straw strength. It is moderately resistant to resistant to wheat stem rust; moderately resistant to moderately susceptible to stripe rust and WSMV; moderately susceptible to leaf rust and barley yellow dwarf virus; and susceptible to Hessian fly, greenbug, bacterial leaf streak, and wheat streak mosaic virus. It was tested in the SRPN in 2012 and 2013 (data available athttp://www.ars.usda.gov/Research/docs.htm?docid=11932) and in the Nebraska State Variety Trials (data available at: http://cropwatch.unl.edu/web/varietytest/wheat). Based

upon the data we have collected so far, NE09521 seems to haveadapted to the Northcentral and Northern High Plains and be best suited for production in eastern Nebraska and states south and west of Nebraska where less disease resistance is needed. Based upon our end-use quality data to date, NE09521 would be lower in test weight and have average end-use quality. This line is being considered for release to certified seed producers in 2015. Compared to Wesley (moderately susceptible to susceptible for scab reaction and susceptible for DON accumulation) and Overland (moderately resistance to scab reaction and moderately resistant for DON accumulation), NE09521 is considered as being moderately resistant for scab reaction and susceptible for DON accumulation.

NE10589 is derived from the cross OK98697/Jagalene//Camelot. It has good testweight, is a taller semi-dwarf with medium late maturity. It is resistant to susceptible to Hessian fly, moderately resistant to stem, leaf, and stripe rust and bacterial streak. By markers, it may have the Lr37/Sr38/Yr17 translocation. This line seems to be very broadly adapted and was selected using phenotypic and genomic selection. This is a favorite line by yield and genomic selection. In considering its yield and test weight, in head-to-head comparisons, it was the best yielding line in my program of those lines near release.

		Yield			Test Wt.	
	Trials	% of NE10589	Significance	Trials	% of NE10589	Significance
Camelot	29	89	***	14	99	ns
Goodstreak	29	85	***	14	99	ns
Panhandle	19	87	***	8	98	ns
Freeman	19	96	**	8	97	**
NE07531	19	93	***	8	98	**
NE09517	20	94	**	8	101	ns
NE09521	20	93	***	8	99	ns
Robidoux	19	95	*	8	100	ns
NW07505	19	94	**	8	99	ns
Overland	29	95	**	14	100	ns
Settler CL	19	91	**	8	100	ns
Wesley	24	87	***	12	98	**

With the release of new varieties Overland, Camelot, Freeman, Goodstreak, McGill, Panhandle, Robidoux, and Settler CL, many of the most advanced current breeding lines are not expected to be released.

2. Nebraska Variety Testing

Numerous entries were included in some or all of the locations in the Fall Sown Small Grain Variety Tests in 2014. Twelve dryland locations, plus one irrigated location, in Nebraska were harvested for yield data.

In 2014, the top ten entries for dryland production (11 environments) were:

Dryland	Yield	Dryland(?)	Yield

Entry	bu/a	Entry	bu/a
NE10589	61.7	NE07531	58.7
LCS Mint	60.9	Freeman	57.8
Overland	59.5	Camelot	56.9
NE09521	59.4	T158	56.8
NE09517	59.3	NE10478	55.8

As would be expected, the two lowest yielding lines were Scout 66 (46.3 bu/a) and Turkey (47.8 bu/a), which were 25% and 23% lower yielding (respectively) than the highest yielding line. That Turkey had a higher yield than Scout 66 may be due to the late rains, which favored late cultivars.

In 2013, the top ten entries for dryland production (11 environments) were:

	Yield		**Yield**
Entry	bu/a	Entry	bu/a
LCS Mint	57.03	NE06607	55.07
Overland	55.82	NE08499	54.88
NE09517	55.28	T158	54.81
NE09521	55.24	NI08708	54.80
Freeman	55.17	BL11002	54.40

As would be expected the two lowest yielding lines were Scout 66 (44.38 bu/a) and Turkey (42.10 bu/a) which were 22% and 26% lower yielding (respectively) than the highest yielding line.

In 2012, the top ten entries for dryland production were:

	Yield		**Yield**
Entry	bu/a	Entry	bu/a
NE06545	59.31	WB Armour	55.38
SY Wolf	58.60	NI08708	55.13
McGill	56.44	NW0366	55.08
Overland	55.78	NE08659	55.06
Mattern	55.53	Settler CL	54.96

3. Irrigated Wheat Trials:

In 2014, harvesting only occurred at the Hemingford site.

The top ten lines in 2014 were: Entry	Yield	Entry	Yield
	bu/a		bu/a
WB-Grainfield	126.7	Brawl Cl Plus	119.5
WB-Cedar	125.3	NE10478	119.4
Denali	123.7	Wesley	119.3
WB4458	121.9	NX04Y2107W	118.8
Byrd	120.3	Antero	117.7

As compared to 2013 this trial would be considered very high yielding and it is interesting to see how the

rankings change with the overall environmental level. When breeding for higher grain yield potential, irrigated wheat trials are very helpful.

In 2013, only the site at Hemingford was harvested.

The top ten lines in 2013 were:

	Yield		Yield
Entry	bu/a	Entry	bu/a
SY Wolf	114	NW07505	110
NE09517	114	Mattern	108
LCH08-80	112	T163	108
Anton	110	NI06736	108
Armour	110	Panhandle (NE05548)	107

The irrigated data this year continues to show the benefits of having a dedicated irrigated wheat development nursery to select lines that have excellent performance (e.g. NI06736). Interestingly, Panhandle, a very tall semi-dwarf wheat, did well in this trial, which may indicate that it has a higher potential than our conventional tall wheat cultivars, when the conditions are right.

The top ten lines in 2012 were:

	Yield		Yield
Entry	bu/a	Entry	bu/a
WB-Aspen	86.87	NI07703	77.80
Brawl CL Plus	85.10	NE06430	77.80
Anton	82.63	SY-Wolf	76.57
WB- Armour	79.17	Byrd	76.47
Mattern	78.13	Settler CL	75.73

As in the past, we have an experimental line irrigated nursery, which grows under irrigation in western Nebraska and under dryland conditions throughout the state. The goal of this nursery is to identify higher yielding lines under irrigation and under higher rainfall conditions, which periodically occur in Nebraska. In 2014 (next page), we were able to harvest all of the dryland sites (Lincoln, North Platte, \and Alliance) and the irrigated site (Hemmingford). We have made considerable progress in reducing height and lodging, but additional disease resistance is needed. The data is color coded with dark green having the greatest values and red having the lowest values. It should be noted that the tallest wheats will be coded red (undesirable for this nursery), while the highest yielding and test weights, will be in dark green. The yield data from Lincoln was not correlated with the data from Alliance or the irrigated site, however, the yield data from Alliance was weakly correlated with the data from the western irrigated site, indicating some similarities among the sites and that the rainfed site at Alliance received enough moisture to partially mimic the irrigated site. The alternative explanation is that both suffered from wheat stem sawfly infestation ,which may have made the yields at both sites more similar. he correlation among rainfed and irrigated trials, indicated that the no trial could explain more than 25% of the variation in another trial. Hence, the continued testing in different locations is warranted because each location is giving us new data. The data from 2014 are:

entry	Name	Dryland Lincoln Yield bu/a	Dryland Nplatte Yield bu/a	Dryland Alliance Yield bu/a	Dryladn Average Yield bu/a	Rank	Irrigated Hemmingford Yield bu/a	Rank	Test Weight Average lbs/bu	Height Average in
1	Antelope	68.2	39.6	57.1	54.97	31	113.6	13	60.25	32.23
2	NI04421	78.9	41.2	54.8	58.30	17	83.7	39	58.70	34.05
3	NI08707	78.6	49.6	63.4	63.87	2	116.7	12	58.30	32.40
4	NI09707	74.1	46	64.5	61.53	6	103.1	33	59.85	31.80
5	NI10718W	73.6	44.5	60.9	59.67	8	105.8	29	57.85	33.30
6	NI10720W	80.9	49.4	44.1	58.13	18	108.5	25	59.25	34.53
7	WESLEY	71.1	46.9	59.9	59.30	10	110.1	22	59.00	30.95
8	NW07534	69.9	51.1	53.1	58.03	20	120.4	5	59.00	31.33
9	NI12713W	66	44.6	53	54.53	33	122.2	4	60.45	33.75
10	NI13703	70.2	39	57.1	55.43	30	91.7	36	60.15	32.73
11	NI13704	65.7	37.2	63.9	55.60	29	117.9	10	60.40	31.83
12	NI13705	63	42.3	51.8	52.37	40	110.3	21	61.00	32.98
13	NI13711	70.5	42.5	57.3	56.77	25	100.7	34	60.25	33.15
14	NI13713	69.8	40.2	48.7	52.90	37	104.5	31	58.80	31.55
15	Settler CL	72	47.4	56.6	58.67	16	113.5	14	58.85	32.40
16	NE09481	68.7	44.5	44.1	52.43	39	91.3	37	59.25	31.23
17	NI13717	71.6	48.9	65.8	62.10	5	125.6	1	59.50	33.83
18	NI13720	72	39.6	51.6	54.40	34	113	16	59.60	30.33
19	NI14719	64.3	44.5	55.9	54.90	32	119.7	7	59.50	29.88
20	NI14720	62	47.7	67.5	59.07	14	112.4	17	58.35	32.93
21	NI14721	72.3	53.1	69.4	64.93	1	110.6	19	59.60	33.35
22	NI14722	72.1	42.1	54.9	56.37	28	118	9	59.00	30.00
23	NI14723	70.5	44.1	63	59.20	12	108.2	26	61.45	32.48
24	NI14724	69.7	39.7	64.8	58.07	19	117	11	59.95	35.33
25	Anton	69.6	41.9	60.4	57.30	23	108.6	24	58.40	31.55
26	WB CEDAR	64.7	38.4	54.7	52.60	38	110.6	19	59.70	28.85
27	NI14727	76.5	41.6	59.5	59.20	12	118.1	8	59.95	34.90
28	NI14728	70.6	42.2	49.2	54.00	36	113.1	15	59.15	31.73
29	NI14729	72.9	48	66.4	62.43	4	108.7	23	60.55	34.08
30	NI14730	74.1	39.8	56.6	56.83	24	111.7	18	60.10	33.93
31	NI14731	70.2	46.5	55.7	57.47	22	106.8	27	59.00	34.93
32	NI14732	66.6	44.4	52.2	54.40	34	120.2	6	58.10	31.13
33	NI14733	68.7	46.9	72.7	62.77	3	122.8	3	59.50	36.23
34	NI14734	75.3	40.2	53.9	56.47	26	87.6	38	58.55	34.45
35	NI14735	74.5	46.3	57.3	59.37	9	94.4	35	59.25	33.33
36	NI14736	75.7	44.1	49.5	56.43	27	82.9	40	58.40	33.68
37	NI14737	74.9	45.6	53.3	57.93	21	104.8	30	58.75	32.25
38	NI14738	68.6	45	63	58.87	15	106.1	28	60.25	30.98
39	NI14739	61.8	50.8	65.1	59.23	11	103.7	32	58.70	30.03
40	SY Wolf	73.6	47.9	62.8	61.43	7	125.1	2	59.20	32.03
	GRAND MEAN	70.84417	44.38	57.89333			109.1			
	LSD	7.59559	6.81723	10.38016			19.1			
	CV	6.59576	9.3951	11.0302			10.7			
	Heritability	0.36551	0.34889	0.4305			0.3			

Data from 2013:

	Lincoln	Alliance	Dryland Avg.	Rank	Sidney Irr.	Rank	Testweight	Height Avg
Name	bu/a	bu/a	bu/a		bu/a		lbs/bu	in
Antelope	68.5	42.4	55.45	37	93.5	35	61.3	34.10
NI04421	66.5	52.7	59.60	18	111.1	2	62.9	34.13
NI06736W	81.5	48.3	64.90	5	99.5	25	61.7	32.30
NI06737W	72.2	42.1	57.15	32	101	23	62.4	33.70
NI07703	69.2	48.8	59.00	22	101.4	22	61.9	33.87
NI08707	67.8	53.3	60.55	15	109.9	3	60.8	32.67
NI08708	71.3	46.5	58.90	23	104.7	15	61.4	33.10
NI09707	65.3	48.7	57.00	33	109.7	4	61.6	31.73
NI09710H	76.8	49.7	63.25	7	95.3	33	60.1	33.23
NI10707	67.9	47.8	57.85	29	98.3	28	61.2	36.17
NI10712	64.3	49.0	56.65	34	107.7	6	61.4	35.50
NI10718W	67.5	54.6	61.05	13	107.1	7	62.5	34.43
NI10720W	68.5	50.8	59.65	17	112.3	1	62.8	33.43
WESLEY	74.0	48.2	61.10	12	103.8	17	61.2	33.17
Settler CL	69.8	46.9	58.35	28	106.2	13	61.8	32.83
NE09481	73.4	51.7	62.55	10	103.9	16	62.5	32.80
NW07534	65.1	48.2	56.65	34	106.3	12	61.2	31.37
NI12702W	84.9	45.8	65.35	2	85.8	38	61.6	34.33
NI12709	81.0	45.0	63.00	8	99.3	26	62.6	33.97
NI12713W	72.4	43.0	57.70	30	99.3	26	62.2	34.27
NI13701	58.5	44.8	51.65	39	76.7	40	61.3	36.57
NI13702	56.1	40.8	48.45	40	86.4	37	62.3	36.53
NI13703	73.1	52.7	62.90	9	106.9	9	63.4	33.87
NI13704	72.0	44.7	58.35	27	105.1	14	61.6	34.73
NI13705	72.6	47.5	60.05	16	106.6	10	63.7	34.90
NI13706	80.1	50.0	65.05	3	98.3	28	61.8	32.57
NI13707	69.5	48.2	58.85	24	103.3	18	62.6	31.43
NI13708	76.5	53.6	65.05	3	95.4	32	62.6	31.80
NI13709	68.3	41.1	54.70	38	94.3	34	60.8	35.10
NI13710	68.2	44.8	56.50	36	106.6	10	63.8	33.43
NI13711	71.4	49.7	60.55	14	107	8	62.9	34.97
NI13712	68.6	48.9	58.75	25	102.2	21	63.1	33.47
NI13713	71.6	47.6	59.60	19	102.4	20	63.5	33.70
NI13714	75.2	43.5	59.35	20	92	36	62	33.10
NI13715	68.0	46.5	57.25	31	100.6	24	61.5	35.93
NI13716	74.9	47.9	61.40	11	96	30	61.6	34.53
NI13717	81.3	48.3	64.80	6	108.7	5	62.4	35.33
NI13718	69.5	47.4	58.45	26	85.7	39	60.6	33.77
NI13719	71.0	47.5	59.25	21	95.5	31	61.1	34.80
NI13720	83.6	47.5	65.55	1	102.5	19	61.9	31.10
Mean	71.45	47.66	59.555		100.72		61.99	
LSD	7.87	9.11	8.49		11.44		1.1	
CV	6.74	11.75	9.245		6.94		1.09	
Heritability	0.98	0.52	0.75		0.98		0.98	

Data from 2012:

	Lincoln	N. Platte	Alliance	Kansas	**Average**	**Rank**	**NE. Avg.**	**NE-Rank**	Height	Anthesis	TestWT
name	bu/a	bu/a	bu/a	bu/a	bu/a		bu/a		(in)	(Julian day	lbs/bu
Antelope	44.70	46.10	48.20	60.00	**49.75**	**33**	**46.33**	**30**	36.44	125.5	63.98
TAM111	50.20	52.30	51.70	71.10	**56.33**	**10**	**51.40**	**13**	24.80	118.9	52.23
WESLEY	52.20	45.90	52.90	61.60	**53.15**	**21**	**50.33**	**16**	29.11	128.5	57.87
NI04421	61.30	56.80	55.00	71.00	**61.03**	**1**	**57.70**	**3**	20.57	123.1	48.89
NI06736W	39.90	52.20	44.60	79.30	**54.00**	**19**	**45.57**	**33**	32.52	117.4	60.97
NI06737W	41.00	41.60	46.00	74.40	**50.75**	**29**	**42.87**	**37**	36.29	117.2	63.50
NI07703	45.50	49.70	48.00	82.10	**56.33**	**10**	**47.73**	**24**	27.24	117.9	56.38
NI08707	56.40	41.20	50.30	75.50	**55.85**	**13**	**49.30**	**20**	27.43	117.8	55.08
NI08708	54.80	51.00	54.30	74.40	**58.63**	**6**	**53.37**	**8**	22.46	119.1	49.85
NI08714	38.20	34.30	52.20	61.60	**46.58**	**40**	**41.57**	**40**	40.52	117.3	65.94
NI09703	57.90	41.60	52.50	58.50	**52.63**	**23**	**50.67**	**15**	29.56	125.1	56.55
NI09707	49.20	44.30	48.40	69.80	**52.93**	**22**	**47.30**	**26**	31.77	116.1	57.96
NI09710H	58.10	48.60	50.30	72.90	**57.48**	**8**	**52.33**	**10**	23.44	122.7	52.05
NI10703	50.80	40.90	41.00	59.30	**48.00**	**37**	**44.23**	**35**	38.74	123.2	65.65
NI10705	50.50	34.10	51.40	50.90	**46.73**	**39**	**45.33**	**34**	39.44	129.6	67.68
NI10707	48.30	42.90	48.80	69.10	**52.28**	**24**	**46.67**	**28**	32.89	118.6	59.83
NI10712	51.30	46.20	49.10	73.60	**55.05**	**16**	**48.87**	**21**	28.62	124.4	58.01
NI10718W	60.20	51.70	51.70	69.30	**58.23**	**7**	**54.53**	**6**	22.51	124	50.84
NI10720W	52.10	43.20	49.00	62.90	**51.80**	**27**	**48.10**	**22**	32.37	127.5	60.62
Settler C	54.60	49.10	51.80	81.80	**59.33**	**3**	**51.83**	**12**	22.28	121.4	51.89
NE08402	51.70	31.80	42.00	73.50	**49.75**	**33**	**41.83**	**39**	37.94	118.8	65.25
NE08410	49.00	32.20	44.90	64.30	**47.60**	**38**	**42.03**	**38**	39.34	119.9	65.75
NE08509	59.20	46.70	52.20	58.20	**54.08**	**18**	**52.70**	**9**	26.57	124	53.19
NE09481	55.40	45.30	55.90	80.60	**59.30**	**4**	**52.20**	**11**	22.40	116.2	49.87
NE09499	57.10	37.20	49.30	65.20	**52.20**	**25**	**47.87**	**23**	31.96	119.7	58.22
NW07534	66.80	57.20	50.80	69.20	**61.00**	**2**	**58.27**	**2**	20.76	123.8	48.85
NI12701	56.50	45.70	47.60	57.30	**51.78**	**28**	**49.93**	**17**	31.64	124.5	57.71
NI12702	65.70	60.20	50.20	60.50	**59.15**	**5**	**58.70**	**1**	21.57	127.9	50.16
NI12703	71.20	46.10	43.90	61.30	**55.63**	**14**	**53.73**	**7**	24.91	124.7	52.20
NI12704	50.00	44.40	43.90	61.10	**49.85**	**32**	**46.10**	**31**	36.37	124.3	63.89
NI12705	59.20	50.70	54.30	50.00	**53.55**	**20**	**54.73**	**5**	26.58	127.2	52.93
NI12706	50.50	50.50	52.20	76.60	**57.45**	**9**	**51.07**	**14**	24.69	116.9	51.86
NI12707	45.00	45.60	50.80	65.90	**51.83**	**26**	**47.13**	**27**	33.38	120	60.13
NI12708	48.60	38.00	44.60	70.80	**50.50**	**30**	**43.73**	**36**	36.58	122.5	65.03
NI12709	49.50	47.80	51.40	76.40	**56.28**	**12**	**49.57**	**19**	26.86	121.8	55.89
NI12710	53.60	37.60	48.50	57.50	**49.30**	**35**	**46.57**	**29**	36.86	124.7	63.52
NI12711	69.50	45.20	53.60	52.70	**55.25**	**15**	**56.10**	**4**	25.03	126.7	51.91
NI12712	54.10	40.10	48.50	58.10	**50.20**	**31**	**47.57**	**25**	34.52	126.1	61.87
NI12713	57.30	46.30	45.60	69.00	**54.55**	**17**	**49.73**	**18**	28.24	118.3	54.85
NI12714	42.00	41.70	53.50	59.40	**49.15**	**36**	**45.73**	**32**	37.91	122.3	64.07
GRAND M	**53.23**	**45.10**	**49.52**	**66.67**	**53.63**		**49.28**		**30.08**	**122.14**	**57.57**

The three-year averages for the lines tested in all three years (2012-2014) is below. The importance of the sustained effort in irrigation is very obvious in that it provides us with a window into the highest yielding environments, something that rainfed environments rarely do. The mean yield of the lines in the irrigated environments (101 bu/a) is roughly twice the average of the rainfed environments for the same years. As can be seen in the table, Robidoux continues to be an excellent rainfed wheat with broad adaptation. Settler CL continues to be one of our most broadly adapted wheats from rainfed to irrigated. Additional wheat experimental lines perform well in either rainfed or irrigated production systems. The question will be: "Can a wheat with excellent irrigated production capabilities have a sufficient market to warrant its release for irrigated production environments alone?"

2012-2014	Linc.	N.Platte	Alliance	**Average**	**Dryland**	**Alliance IRR**	**IRR**
	Yield	Yield	Yield	**Yield**	**Rank**	Yield	**Rank**
	bu/a	bu/a	bu/a	**bu/a**		bu/a	
name						yb_sd11	
Antelope	60.47	42.85	49.23	52.25	**11**	97.60	**9**
NE09481	65.83	44.90	50.57	55.73	**7**	94.43	**10**
Robidoux	68.90	49.00	54.17	58.53	**1**	94.27	**11**
NI08707	67.60	45.40	55.67	57.91	**3**	105.87	**2**
NI09707	62.87	45.15	53.87	55.28	**9**	100.10	**7**
NI10718W	67.10	48.10	55.73	58.42	**2**	100.90	**5**
NI10720W	67.17	46.30	47.97	55.29	**8**	99.67	**8**
NI12713W	65.23	45.45	47.20	53.99	**10**	106.23	**1**
NW07534	67.27	54.15	50.70	57.65	**4**	104.07	**3**
Settler CL	65.47	48.25	51.77	56.28	**6**	103.53	**4**
WESLEY	65.77	46.40	53.67	56.91	**5**	100.57	**6**
Mean	**65.79**	**46.90**	**51.87**			**100.66**	

4. Nebraska Intrastate Nursery:

The 2014 Nebraska Intrastate Nursery (NIN) was planted at seven locations in Lincoln, Mead, Clay Center, McCook (added due to generous support from ConAgra, now Ardent Mills), North Platte, Sidney, and Hemingford, NE. All sites were harvested. A collaborative site was in Kansas (data not shown). The low yields at Mead were due to heavy and persistent rains, which led to severe bacterial streak infections. Lincoln also had bacterial streak disease but it did not drastically reduce grain yield. The other tested sites all had normal to above normal grain yields. The quality of the trials was good and the CVs (coefficient of variation, a measure of error variation and the ability to separate lines statistically) were all good. Of the lines tested in 2014, NHH11569 (a two-gene Clearfield line did particularly well). Unfortunately, when sprayed with herbicide, it has an unacceptable injury level due to modifier genes of the two gene herbicide resistance. It should become a very valuable parent.

Two other single gene lines (NH11489 and NH11490, all single gene lines have been dropped) were agronomically excellent and will become parents. NE09517 and NE10589 under increase for possible release continued to do very well. The value of the irrigated program continues to be shown in NI13706, which did very well in this nursery and was first identified in the IRDR nursery. Of the released lines, Overland, Camelot and Robidoux had very good years. Included in the data are data on bacteria streak tolerance. Overland, Freeman, and a number of other lines including NHH11569 are better for tolerance/resistance to this disease. As expected Cheyenne and Scout 66 were the lowest-yielding lines in the trial, though it was a surprise to see Cheyenne have a higher yield than Scout 66. As in the past, the correlation among sites ranged from r= -0.06 n.s. (n= 60, North Platte and Kansas) to a high of r =0.66** (n=60, Lincoln with Clay Center) indicating in this year both sites provided somewhat similar data though either site could explain less than half of the variation at the other site. The low correlation between sites emphasizes that it is important to continue testing at all of our sites to represent the possible growing areas for our advanced lines.

2014	Mead	Linc.	ClayCen	McCook	Nplatte	Sidney	Alliance	**Average**		Average	Average	Average	Average	Average
	Yield	Yield	Yield	Yield	Yield	Yield	Yield	**Yield**	**Rank**	Testwt	Height	Hdate	WintSurv	BacStreak
name	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	**bu/a**						
WESLEY	25.7	70.0	51.5	87.6	58.3	56.2	66.9	**59.5**	**41**	60.2	30.8	148.4	100	5.7
OVERLAND	34.1	71.9	60.7	82.8	56.9	70.8	68.3	**63.6**	**16**	61.2	33.8	148.4	100	3.4
NE01481	26.7	68.3	49.0	87.2	56.4	73.8	50.5	**58.8**	**49**	61.1	33.5	148.0	100	5.9
NI04420	33.0	71.2	53.1	83.0	53.8	74.3	70.2	**62.7**	**20**	61.9	31.7	148.3	95	5.5
NE06430	31.4	72.1	47.5	82.5	54.6	64.0	59.6	**58.8**	**50**	61.0	32.2	147.7	98	6.2
NE06545	30.9	72.6	56.4	70.6	51.6	74.5	72.2	**61.3**	**30**	59.8	30.8	147.9	94	3.9
NE07486	33.2	73.9	50.8	81.4	49.5	70.4	62.8	**60.3**	**34**	61.1	31.4	147.5	100	4.4
NE07531	27.9	74.7	52.9	81.5	52.2	72.5	68.9	**61.5**	**27**	60.3	32.4	148.0	100	6.0
NE08499	34.7	72.7	56.9	80.4	45.4	66.9	61.2	**59.7**	**39**	60.5	32.4	147.7	95	3.8
NE09517	33.5	72.7	59.2	86.3	54.9	79.5	67.3	**64.8**	**8**	61.6	32.9	148.2	100	5.6
NE09521	31.9	69.4	55.0	80.5	55.1	71.3	57.9	**60.2**	**37**	60.8	34.0	148.1	89	5.6
NE10478	30.8	79.1	52.6	87.5	54.2	62.6	56.4	**60.5**	**32**	61.0	29.5	148.0	97	6.2
NE10507	34.1	76.2	53.4	87.8	56.9	77.2	52.7	**62.6**	**21**	59.7	32.8	148.0	98	4.9
NE10589	26.2	77.9	63.5	85.6	54.5	77.7	71.8	**65.3**	**4**	60.9	32.1	148.3	94	5.4
NE10683	35.6	73.2	59.5	91.9	60.5	73.0	61.9	**65.1**	**7**	58.3	33.4	148.7	100	5.5
NH11489	31.2	78.7	56.2	90.5	61.4	76.9	62.1	**65.3**	**5**	61.9	31.5	147.7	98	5.5
NH11490	31.3	79.1	62.9	91.9	57.0	70.3	65.1	**65.4**	**3**	61.8	29.9	147.3	100	5.8
NHH11569	43.9	77.9	68.4	86.2	56.5	77.0	64.7	**67.8**	**1**	60.7	33.3	147.7	97	3.2
NI09710H	21.9	70.1	45.6	89.9	62.1	61.7	64.3	**59.4**	**42**	58.7	31.0	150.1	100	6.5
NW03666	32.5	67.9	54.3	86.3	53.1	69.8	53.7	**59.7**	**40**	61.0	33.3	148.9	84	3.9
NW07505	36.9	73.8	58.0	94.1	53.7	72.8	61.2	**64.4**	**12**	60.5	32.9	148.1	92	4.9
NW09627	33.3	68.3	48.7	76.2	47.3	72.1	68.6	**59.2**	**46**	60.5	31.3	147.2	97	5.4
NW11511	29.3	69.6	51.3	85.6	58.0	68.2	71.7	**62.0**	**26**	59.5	30.8	149.2	88	5.7
NI12702W	30.2	73.0	58.6	84.0	57.0	68.3	67.1	**62.6**	**23**	62.6	32.1	148.4	91	3.8
NI12709	31.2	77.0	57.6	89.5	56.3	70.3	60.1	**63.1**	**17**	61.7	31.6	147.8	100	5.0
NI13703	30.3	67.6	48.3	92.3	54.9	64.1	55.7	**59.0**	**48**	62.2	31.2	146.1	95	5.7
NI13706	36.9	75.1	56.3	97.3	55.0	81.3	64.9	**66.7**	**2**	61.5	30.5	147.6	100	6.2
NI13708	32.8	67.6	50.6	88.4	57.1	69.6	54.3	**60.1**	**38**	61.5	29.1	147.8	100	6.8
Camelot	35.3	75.7	58.7	83.6	51.6	76.5	68.1	**64.2**	**13**	61.1	34.5	149.9	97	4.4
NI04421	28.3	69.4	56.2	95.4	59.6	78.5	58.3	**63.7**	**15**	60.8	32.2	148.8	98	5.8
Settler CL	25.9	69.3	46.6	90.0	57.9	70.5	54.8	**59.3**	**45**	61.4	30.9	148.8	100	5.8
NI13717	24.8	70.6	47.9	84.2	56.8	66.9	71.1	**60.3**	**33**	61.0	31.7	148.4	95	5.9
NI13720	34.2	70.8	55.5	87.9	56.9	65.0	64.2	**62.1**	**25**	60.9	28.3	148.2	100	5.5
NE12408	32.4	69.0	55.6	62.3	53.2	71.5	51.8	**56.5**	**56**	60.0	30.7	147.9	97	5.6
NE12409	26.7	58.4	39.1	76.3	47.1	61.9	58.8	**52.6**	**58**	60.8	29.9	148.8	83	5.4
NE12429	32.0	73.0	58.2	89.2	59.3	75.8	63.5	**64.4**	**11**	61.6	31.1	148.9	100	4.8
NE12430	29.3	74.0	49.4	76.6	53.6	69.1	59.7	**58.8**	**51**	61.2	30.8	148.2	89	6.4
NE12438	37.9	72.4	57.1	87.1	58.2	76.0	62.8	**64.5**	**10**	61.0	33.1	147.7	98	3.8
NE12439	40.6	72.0	57.2	83.6	58.2	75.7	69.7	**65.3**	**5**	60.7	31.7	147.0	90	3.5
NE12443	29.9	71.6	56.0	67.1	54.4	71.7	70.6	**60.2**	**35**	60.6	33.6	147.9	100	3.6
NE12444	24.7	60.1	51.0	82.0	48.0	76.7	71.8	**59.2**	**47**	62.3	31.8	148.1	97	5.3
NE12461	25.4	70.2	49.9	89.0	54.5	69.4	56.8	**59.3**	**44**	60.7	30.7	148.5	95	4.7
NE12464	21.9	68.3	47.0	81.0	59.5	74.8	68.6	**60.2**	**36**	60.4	31.6	148.0	95	5.7
NE12483V	33.2	71.4	45.3	83.3	45.5	68.9	61.5	**58.4**	**52**	61.1	30.6	147.7	95	5.6
NE12488	30.2	69.2	52.2	85.2	57.4	72.9	71.2	**62.6**	**21**	61.7	32.2	147.8	100	5.2
NE12510	22.9	73.9	59.2	81.8	30.5	55.2	51.9	**53.6**	**57**	54.4	30.0	149.0	95	4.5
NE12518	19.7	73.6	56.3	72.7	48.3	69.2	62.5	**57.5**	**54**	60.2	34.6	148.3	98	5.5
NE12524	31.3	71.2	42.5	81.2	41.5	68.6	66.1	**57.5**	**53**	60.7	31.4	149.0	100	6.7
NE12561	31.8	79.2	54.1	87.3	57.6	74.3	63.5	**64.0**	**14**	62.1	31.0	150.2	98	6.2
NE12571	26.8	75.2	57.4	95.4	48.6	72.2	63.7	**62.8**	**19**	61.3	33.5	148.5	93	5.4
NE12580	27.4	67.6	46.6	90.0	47.1	67.3	52.1	**56.9**	**55**	61.7	30.9	150.9	95	6.2
NE12589	35.3	76.7	59.0	86.6	52.5	70.4	71.5	**64.6**	**9**	61.7	31.9	149.1	94	3.5
NE12630	38.5	69.5	55.4	76.8	48.2	70.9	68.3	**61.1**	**31**	60.4	32.7	147.9	98	4.5
NE12637	27.4	67.6	60.4	84.8	54.5	72.9	70.2	**62.5**	**24**	61.3	31.7	150.4	97	2.7
NE12662	37.4	72.4	56.5	78.7	44.2	64.9	61.2	**59.3**	**43**	61.7	32.9	147.7	97	4.8
NE12686	23.9	70.2	56.9	99.6	53.4	68.7	67.3	**62.9**	**18**	60.9	30.2	148.1	95	5.9
NE05548	30.3	68.9	54.6	82.4	52.7	75.3	65.3	**61.4**	**28**	61.1	36.1	148.5	100	5.9
GOODSTREAK	39.1	74.8	50.5	84.9	46.6	73.3	60.0	**61.3**	**29**	60.4	37.3	148.1	100	3.7
SCOUT66	32.0	57.3	36.5	67.3	40.4	60.1	37.1	**47.2**	**60**	60.6	38.0	148.2	100	5.9
CHEYENNE	25.8	52.2	42.1	70.0	44.9	54.6	47.5	**48.2**	**59**	59.9	37.6	131.8	100	4.3
Mean	30.9	71.3	53.5	84.2	53.1	70.5	62.6	**60.9**		**60.8**	**32.1**	**148.0**	**96.5**	**5.1**
LSD	7.8	7.4	6.8	10.5	10.0	7.4	9.6	**8.5**						
CV	15.5	7.5	7.9	6.1	11.6	6.5	9.5	**9.2**						

In 2014 NIN advance wheat, 50 wheat cultivars were analyzed for kernel characteristics, milling attributes, ash and protein contents, dough rheological and bread-making properties.

There were significant differences in kernel characteristics among these cultivars. The kernel hardness

indexes were 62.5±7.3: 66% cultivars had high hardness (60.0-80.0) including checks Overland, Settle CL, and Scout 66; 30% cultivars had low hardness (< 60.0) including checks Wesley, Goodstreak and Cheyenne; and other cultivars had very high hardness (≥ 80.0). The kernel diameters and weights were 2.7±0.1 mm and 32.8±1.8 mg, respectively. All cultivars including all checks had large diameter (≥ 2.4 mm). Ninety eightpercent of the cultivars including all checks had large seed weights (≥ 30.0 mg).

There were significant differences in milling properties among these cultivars. The flour, bran and short yields were 72.7±1.4 %, 24.5±1.2%, and 2.8±0.5%, respectively. Except of NW11511, all cultivars including all checks produced high flour yield (≥ 68.0%). The bran, short and milling scores were 3.4±0.7, 3.1±0.7, and 3.4±1.2, respectively. Most cultivars including all checks gave fair or better bran cleaning and milling performance.

There were significant differences in ash contents among these cultivars. The ash contents of white flour at 14% mb were 0.37±0.04%. All cultivars including all checks had low ash content (< 0.50%). There were significant differences in protein contents among these cultivars. The protein contents of whole wheat at 12% mb were 13.7±0.6%. All cultivars including all checks had high protein contents of whole wheat (≥ 12.0%). The protein contents of white flour at 14% mb were 12.6±1.0%. After milling, protein contents were lost 0.3±0.6%. All cultivars including all checks had high protein contents of white flour (≥ 10.0%). The protein contents significantly effected on dough rheological properties and bread-making performance.

There were significantly differences in dough rheology among these cultivars. The flour water absorptions (abs) at 14% mb were 65.5±1.9%. Except of NW11511 and NE05548, all other cultivars including checks had high water abs (≥ 62.0%). The peak times (PT), which indicated dough extensibility, were 4.94±1.43 min. 72% cultivars, including checks Overland and Goodstreak, obtained good dough extensibility (PT 3.0-6.0 min), 6% cultivars (NI04421, Scout 66, and NE13434) obtained small dough extensibility (PT < 3.0 min), and the rest of cultivars obtained very large dough extensibility (PT ≥ 6.0 min), including Settler CL. The peak torques (PQ), which were dough maximum strengths, were 52.3±4.1 %TQ. 72% cultivars, including checks Wesley and Scoutt6, gave good dough strengths (PQ 45.0-55.0 %TQ), 4% cultivars (NE06545 and Settler CL) gave weak dough strengths (PQ < 45.0 %TQ), and the remaining cultivars gave very strong dough strength, including checks Wesley, Scott 66 and Cheyenne. The mixing tolerance rate (TR) were 3.8±0.8. The total areas (TA) in 8 min were 142±21 %TQ·min. Both TR and TA indicated dough resistances in mixing. Except for NI04421, which got low dough resistance in mixing (TA < 100 %TQ.min), all cultivars including checks got good dough resistance in mixing (TA 100 - 200 %TQ·min). 84% cultivars got fair or better than fair tolerance score.

There were significant differences in bread-making performance among these cultivars. The baking water abs at 14% mb were 63.6±0.9%. With the exception of NW11511 and SCOUT66, all other cultivars including other checks had high water abs (≥ 62.0%). The mixing times (MT) were 5.25±1.46 min. 74% cultivars, including checks Wesley, Overland, Goodstreak, Scott 66 and Cheyenne, gave normal MT (3.0-6.0 min), and the other cultivars including checks Settler CL gave very long MT (≥ 6.0 min). The dough handling rates were 4.0±0.2 and proof times were 53.5±5.2 min. The weight losses were 19.9±0.7%. The loaf volumes and specific volumes were 939±30 cc and 6.76±0.30 cc/g, respectively. The slice areas were 117±3 cm^2. Except for NW11511, all other cultivars including checks got volumes ≥ 850 cc or specific volumes ≥ 6.12 cc/g. After stored overnight, the breadcrumb firmness was 3017±390 Pa. The crumb brightness was 151±8. The cell numbers were 6835±275. The cell diameters were 2.08±0.12 mm. The non-uniformity was 8.04±35.51. The cell elongation was 149±0.02. The overall bread rates were 4.4±0.4. All cultivars including checks got fair or better than fair bread quality.

The data for 2013 are:

	Mead	Lincoln	C Center	McCook	Alliance	Average	Rank	Hutcheson	NE+KS Avg	Rank	Avg. L and CC	Average
								KS			Test Wt	Height
name	Bu/a	Bu/a	Bu/a	Bu/a	Bu/a	Bu/a		Bu/a			lbs/bu	(in)
WESLEY	70.0	66.6	73.3	43.1	56.5	61.9	46	61.7	61.9	47	56.95	39.2
OVERLAND	71.0	73.7	73.8	39.6	59.8	63.6	31	73.9	65.1	18	58.9	42.4
NE01481	70.6	71.1	67.4	38.9	49.8	59.6	53	66.0	60.5	51	57.75	42.7
NE06430	72.8	76.8	73.1	44.5	56.0	64.6	20	67.4	65.0	20	58.7	42.1
NE06545	80.6	82.4	72.4	40.6	61.2	67.4	5	64.3	67.0	6	56.4	40.9
NE06607	76.5	74.8	76.7	46.6	58.6	66.6	7	64.0	66.3	10	58.45	41.1
NE07486	75.9	72.8	79.6	46.7	52.8	65.6	14	71.9	66.5	7	59.4	41.5
NE07531	77.8	77.5	83.3	43.4	60.4	68.5	3	68.9	68.5	2	58.7	41.6
NE08499	76.5	77.4	74.5	44.5	57.6	66.1	10	57.8	64.9	22	59.45	42.5
NE08659	59.5	60.3	71.7	32.2	54.5	55.6	57	66.5	57.2	57	57.6	42.4
NE09517	73.4	73.1	82.4	39.6	60.7	65.8	11	64.3	65.6	14	60	43.3
NE09521	75.4	70.8	77.5	36.1	62.5	64.5	22	65.6	64.6	23	58.05	42.0
NE10418	70.7	72.1	71.4	40.2	55.2	61.9	44	67.2	62.7	42	59.45	43.8
NE10442	79.8	77.4	66.8	39.1	58.6	64.3	23	61.7	64.0	29	60.25	42.2
NE10478	74.3	77.9	81.3	45.7	56.5	67.1	6	69.8	67.5	4	60.9	40.3
NE10507	79.2	82.2	73.7	41.8	55.5	66.5	8	65.7	66.4	9	56.95	41.5
NE10589	79.8	80.4	71.4	46.6	68.5	69.3	1	65.2	68.7	1	59.1	41.6
NE10625	73.4	71.7	71.3	40.3	61.8	63.7	30	57.8	62.9	39	58.75	41.6
NI04421	69.2	71.1	67.5	53.0	55.6	63.3	35	67.1	63.8	30	58.1	41.4
NE05496	66.1	67.5	78	54.0	54.8	64.1	24	66.6	64.4	24	57.85	42.1
NE10683	78.9	84.0	77.2	40.5	58.0	67.7	4	70.0	68.0	3	57.1	41.6
NE11415	71.2	76.9	74.7	41.8	55.0	63.9	27	65.6	64.2	26	59.5	40.5
NE11455	69.5	77.2	73.1	37.6	55.8	62.6	39	65.2	63.0	37	60.35	42.2
NE11472	74.2	76.6	73.3	44.4	55.9	64.9	18	67.1	65.2	15	59.65	41.8
NE11482	74.7	76.5	74.3	44.6	57.3	65.5	17	62.9	65.1	17	58.85	43.1
NE11499	73.4	72.7	71.3	49.0	49.8	63.2	36	65.3	63.5	31	60.2	39.9
NE11536	73.8	60.6	74.6	43.6	58.2	62.2	43	66.0	62.7	41	58.35	40.8
NE11560	75.6	80.8	74.3	31.1	57.5	63.9	28	60.8	63.4	34	58.05	40.5
NE11607	73.2	72.1	61.4	45.7	57.1	61.9	45	64.8	62.3	43	54.5	42.7
Camelot	71.3	65.9	76.9	46.5	61.8	64.5	21	68.4	65.0	19	58.45	42.7
NH10665	76.6	70.0	71.6	43.4	56.0	63.5	33	61.1	63.2	36	59.3	43.6
NH11489	72.2	77.6	73.9	44.2	59.6	65.5	16	71.6	66.4	8	59.15	41.3
NH11490	74.7	81.7	74.1	49.6	62.6	68.5	2	61.1	67.5	5	60.95	40.8
NH11563	77.0	73.7	73.6	35.9	58.6	63.8	29	66.3	64.1	27	59.05	43.8
NH11565	76.2	74.8	76.8	31.3	53.0	62.4	41	66.5	63.0	38	59.25	39.7
NH11668	64.7	69.0	72.9	37.6	56.7	60.2	52	58.9	60.0	52	59.2	42.0
NHH09655	67.6	65.3	71.7	32.9	50.0	57.5	56	57.3	57.5	56	55.7	39.9
NHH11569	68.6	68.7	74.6	46.6	53.9	62.5	40	59.8	62.1	44	59.5	43.3
NHH11638	78.0	78.9	70.9	48.4	51.4	65.5	15	68.2	65.9	11	60.15	42.9
Settler CL	67.9	68.0	72.7	52.4	56.0	63.4	34	69.2	64.2	25	58.7	41.0
NI04420	77.7	76.7	75.2	40.4	58.5	65.7	12	60.3	64.9	21	59.7	42.0
NI07703	73.7	65.8	71.6	42.4	59.9	62.7	37	63.8	62.8	40	57.9	41.5
NI08708	70.3	69.0	74.5	41.4	62.6	63.6	32	60.9	63.2	35	57	41.0
NI09710H	71.9	69.1	76.8	42.9	67.8	65.7	12	66.9	65.9	12	55.25	40.2
NI10712	66.2	63.3	68	36.2	59.8	58.7	54	61.2	59.1	55	55	41.5
NI10718W	72.0	67.6	70	38.0	54.6	60.4	50	62.1	60.7	50	57.15	41.4
NI12702W	73.7	73.0	72.2	44.7	60.3	64.8	19	59.7	64.1	28	59.85	42.4
NW03666	75.0	67.2	80.8	50.8	57.8	66.3	9	61.6	65.6	13	58.8	42.3
NW07505	71.0	70.1	75.1	42.0	61.9	64.0	26	60.4	63.5	32	57.6	42.6
NW09627	57.1	62.4	77.8	45.5	64.5	61.5	47	60.3	61.3	48	57	40.3
NW10487	53.0	54.9	67.7	41.7	59.1	55.3	58	61.0	56.1	58	55.55	42.0
NW11510	72.7	76.9	62.6	40.0	53.4	61.1	48	67.1	62.0	46	59.05	41.6
NW11511	78.5	73.6	64.3	46.6	57.2	64.0	25	71.6	65.1	16	57.55	40.5
NW11590	70.0	68.9	67.5	40.4	54.9	60.3	51	54.2	59.5	53	58.65	42.0
NW11598	69.1	74.4	72.6	40.4	56.9	62.7	37	68.1	63.5	33	58.7	41.0
NE05548	68.0	66.6	72.1	38.4	59.9	61.0	49	59.8	60.8	49	57.95	44.8
NE11688	76.2	78.3	64.6	38.4	54.4	62.4	42	60.3	62.1	45	55.95	42.1
GOODSTREAK	64.2	59.6	66.5	40.4	62.2	58.6	55	64.7	59.5	54	58.7	43.8
SCOUT66	51.2	47.7	60	37.9	51.0	49.6	59	52.0	49.9	59	58	44.4
CHEYENNE	41.1	39.1	56	40.0	44.3	44.1	60	53.4	45.4	60	57.85	47.1
GRAND MEAN	**71.4**	**71.22**	**72.45**	**42.21**	**57.37**	**62.932**		**63.99**				
LSD	8.54	6.42	8.79	11.27	8.38			7.2				
CV	**7.37**	**6.45**	**7.5**	**13.17**	**7.55**			**6.93**				
Heritability	**0.99**	**0.99**	**0.72**	**0.98**	**0.98**			**0.98**				

The 2012 data are presented below:

name	Kansas	Mead	Linc.	Clay Cen.	N. Platte	McCook	Sidney	Heming.	Avg.	NE Avg.	Rank	NE Rank
	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a
WESLEY	56.2	66.3	50.1	42.4	42.1	71.9	62.3	26.5	52.23	51.66	38	41
Overland	61.9	78.6	57.6	63.3	47.0	76.6	66.4	22.4	59.23	58.84	7	6
NE05496	62.4	57.6	50.0	48.6	38.6	77.3	69.9	25.3	53.71	52.47	29	36
NE05548	41.1	60.0	47.6	50.5	36.7	59.4	63.0	23.6	47.74	48.69	55	54
NE06430	59.8	63.0	49.6	51.6	45.1	79.3	65.6	25.5	54.94	54.24	21	23
NE06545	62.1	72.0	59.8	64.5	54.2	82.0	60.5	26.6	60.21	59.94	5	3
NE06607	57.5	65.8	51.9	54.4	44.0	75.4	60.0	25.2	54.28	53.81	25	26
NE07486	79.0	67.0	51.3	60.8	52.1	79.8	67.3	24.7	60.25	57.57	4	11
NE07531	55.7	60.6	50.7	51.7	42.2	79.9	60.5	26.1	53.43	53.10	32	30
NE07627	45.4	66.9	51.0	54.4	44.2	69.9	61.9	25.5	52.40	53.40	36	28
NE08457	55.2	57.4	50.5	49.2	40.6	58.3	49.9	24.4	48.19	47.19	53	56
NE08476	50.3	62.9	51.7	61.5	38.5	54.7	61.9	23.7	50.65	50.70	45	45
NE08499	61.1	66.7	51.3	54.4	46.8	75.3	66.7	26.4	56.09	55.37	15	14
NE08527	49.7	68.5	54.7	55.1	32.9	62.0	52.2	25.3	50.05	50.10	48	48
NE08555	63.6	62.3	50.4	59.2	42.8	65.9	56.2	26.6	53.38	51.91	33	38
NE08659	41.1	64.2	55.1	60.1	27.4	64.2	61.5	25.1	49.84	51.09	49	43
NE09491	49.6	64.6	45.2	53.4	37.9	65.4	59.3	26.5	50.24	50.33	47	46
NE09495	28.2	69.3	56.0	26.3	47.0	73.6	61.6	21.7	47.96	50.79	54	44
NE09499	53.2	64.2	55.0	43.7	36.7	67.4	59.2	23.3	50.34	49.93	46	50
NE01481	51.7	78.9	63.0	57.1	47.7	73.4	63.2	25.0	57.50	58.33	11	9
NE09517	67.0	63.3	49.2	64.6	50.5	74.9	46.7	25.8	55.25	53.57	20	27
NE09521	61.6	73.8	51.0	61.4	54.8	75.5	65.1	27.2	58.80	58.40	9	8
NE09637	34.9	62.8	52.4	39.3	29.3	68.3	53.3	25.4	45.71	47.26	58	55
NE10418	60.8	62.1	43.5	50.5	47.7	75.9	63.9	24.4	53.60	52.57	31	34
NE10431	54.5	65.4	54.4	55.5	46.0	79.2	58.1	25.2	54.79	54.83	22	18
NE10442	72.2	60.6	42.2	55.8	48.6	79.5	58.2	25.3	55.30	52.89	19	32
NE10449	46.2	60.8	53.3	56.9	34.1	61.6	53.8	24.2	48.86	49.24	51	52
NE10478	81.6	67.9	48.4	61.1	51.7	87.2	65.8	30.7	61.80	58.97	1	5
NE10507	67.3	72.5	62.1	71.3	49.1	81.5	62.7	25.8	61.54	60.71	3	2
NI04421	59.6	68.8	59.3	64.4	54.9	76.7	64.9	26.0	59.33	59.29	6	4
Camelot	48.0	58.8	47.4	50.4	40.8	61.7	62.4	23.3	49.10	49.26	50	51
NE10509	44.9	71.1	63.6	49.8	42.6	66.9	62.9	28.3	53.76	55.03	28	16
NE10514	49.0	61.9	47.9	57.8	42.8	72.2	59.2	30.8	52.70	53.23	35	29
NE10517	56.6	67.6	44.6	54.8	41.1	63.3	58.1	28.1	51.78	51.09	42	42
NE10522	46.3	58.4	41.0	48.3	42.9	64.3	61.2	27.1	48.69	49.03	52	53
NE10529	50.4	75.2	60.6	64.6	48.3	65.8	61.2	27.9	56.75	57.66	13	10
NE10559	60.6	61.8	43.5	51.5	41.2	63.4	64.7	26.0	51.59	50.30	43	47
NE10589	59.0	74.4	64.8	71.0	53.4	81.0	61.9	27.7	61.65	62.03	2	1
NE10609	40.0	58.4	56.8	52.6	39.7	74.7	58.1	26.6	50.86	52.41	44	37
Settler CL	70.5	64.9	52.1	45.4	45.5	81.6	69.9	24.9	56.85	54.90	12	17
NE10625	49.7	72.2	45.1	52.0	44.5	77.5	65.3	26.4	54.09	54.71	27	21
NE10628	53.7	65.4	49.7	56.0	45.3	64.6	57.9	23.5	52.01	51.77	40	40
NE10638	54.1	54.7	43.9	50.4	37.2	52.1	53.9	23.8	46.26	45.14	57	58
NE10683	50.4	59.8	66.0	58.2	42.5	74.3	58.8	24.0	54.25	54.80	26	19
NH09563	58.2	62.1	47.6	56.9	45.2	76.6	65.2	26.0	54.73	54.23	23	25
NH10665	61.3	69.9	55.1	68.5	51.0	70.9	70.0	24.6	58.91	58.57	8	7
NHH09655	57.1	62.2	50.8	54.7	50.1	69.7	65.7	26.5	54.60	54.24	24	24
NI04420	65.7	66.9	49.1	61.8	51.0	75.9	63.2	31.1	58.09	57.00	10	12
NI08708	63.1	59.2	46.6	52.2	44.9	75.0	60.2	25.3	53.31	51.91	34	39
NI09706	51.6	51.1	42.7	37.4	34.7	74.6	58.4	25.0	46.94	46.27	56	57
NI09709	69.7	62.3	47.8	55.6	47.6	72.4	69.5	28.2	56.64	54.77	14	20
NI09714W	66.3	64.1	53.1	67.0	46.3	62.4	61.1	26.2	55.81	54.31	17	22
NW03666	58.1	64.9	49.2	55.6	37.4	74.2	65.6	24.0	53.63	52.99	30	31
NW07505	55.3	71.0	54.3	61.4	39.1	72.1	62.5	27.8	55.44	55.46	18	13
NW09627	65.7	51.0	45.7	51.0	40.9	70.5	62.5	27.9	51.90	49.93	41	49
NW10401	60.4	70.1	50.7	59.1	43.4	73.8	64.7	25.2	55.93	55.29	16	15
NW10487	48.8	65.2	51.4	49.3	39.2	73.7	62.5	27.0	52.14	52.61	39	33
GOODSTREAK	43.9	50.6	46.6	45.3	38.1	47.8	53.0	24.5	43.73	43.70	59	59
SCOUT66	43.5	38.8	31.2	33.3	32.4	56.2	49.5	19.6	38.06	37.29	60	60
CHEYENNE	50.6	59.0	54.4	53.1	42.1	73.1	58.4	27.5	52.28	52.51	37	35
GRAND MEAN	**55.71**	**64.12**	**51.2**	**54.46**	**43.38**	**70.9**	**61.15**	**25.73**	**53.33**	**52.99**		

Data from 2012 to 2014 (three year average) from the Nebraska Intrastate Nursery for Grain Yield (bu/a) are presented below:

2012-	Mead	Linc.	C. Center	N. Platte	Sidney	Alliance	McCook	**NE Avg.**	
2014	Yield	Yield	Yield	Yield	Yield	Yield	Yield	**Yield**	**Rank**
Name	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	**(bu/a)**	
Camelot	55.1	63.0	61.0	46.2	69.5	51.1	63.9	59.1	**18**
CHEYENN	42.0	48.6	50.7	43.5	56.5	39.8	61.0	48.3	**25**
GOODSTR	51.3	60.3	54.3	42.4	63.2	48.9	57.7	54.6	**24**
NE01481	58.7	67.5	58.4	52.1	68.5	41.8	66.5	59.0	**20**
NE05548	52.8	61.0	59.2	44.7	69.2	49.6	60.1	57.0	**22**
NE06430	55.7	66.2	58.1	49.9	64.8	47.0	68.8	59.4	**17**
Freeman	61.2	71.6	64.5	52.9	67.5	53.3	64.4	62.9	**3**
NE07486	58.7	66.0	62.8	50.8	68.9	46.8	69.3	61.0	**13**
NE07531	55.4	67.6	62.8	47.2	66.5	51.8	68.3	61.1	**12**
NE08499	59.3	67.1	62.6	46.1	66.8	48.4	66.7	60.5	**14**
NE09517	56.7	65.0	69.5	52.7	63.1	51.3	66.9	61.5	**9**
NE09521	60.4	63.7	65.2	55.0	68.2	49.2	64.0	61.1	**11**
NE10478	57.7	68.5	64.1	53.0	64.2	47.9	73.5	62.0	**6**
NE10507	61.9	73.5	66.0	53.0	70.0	44.7	70.4	63.2	**2**
NE10589	60.1	74.4	68.0	54.0	69.8	56.0	71.1	65.4	**1**
NE10683	58.1	74.4	64.7	51.5	65.9	48.0	68.9	62.5	**4**
NI04420	59.2	65.7	62.3	52.4	68.8	53.3	66.4	61.6	**8**
Robidoux	55.4	66.6	62.7	57.3	71.7	46.6	75.0	62.1	**5**
NW03666	57.5	61.4	65.3	45.3	67.7	45.2	70.4	60.0	**15**
NW07505	59.6	66.1	65.6	46.4	67.7	50.3	69.4	61.4	**10**
NW09627	47.1	58.8	58.7	44.1	67.3	53.7	64.1	56.8	**23**
Overland	61.2	67.7	65.4	52.0	68.6	50.2	66.3	61.9	**7**
SCOUT66	40.7	45.4	43.6	36.4	54.8	35.9	53.8	44.8	**26**
Settler CL	52.9	63.1	56.0	51.7	70.2	45.2	74.7	59.4	**16**
WESLEY	54.0	62.2	54.3	50.2	59.3	50.0	67.5	57.4	**21**
Mean	**55.7**	**64.6**	**61.0**	**49.2**	**66.3**	**48.2**	**66.8**	**59.4**	

As can be seen from the excellent three-year yields of released lines (Robidoux, Freeman, Settler CL, and Overland), our released lines continue to do well, but we have many experimental lines with excellent grain yields in the east, central, or west parts of Nebraska. Of particular note are the NE10 lines (NE10589, NE10507, ND10683) which continue to do well in our and the State Variety Trials. As expected Cheyenne and Scout 66 were the lowest yielding lines, but again it was surprising that Scout 66 was lower yielding than Cheyenne. Both broadly and more narrowly adapted lines have value in wheat production.

5. Nebraska Triplicate Nursery (NTN):

The same comments about the NIN data apply to the NTN. Again Mead was low yielding due to disease and McCook had excellent yields with the remaining location being normal to good. In this nursery, Camelot and Goodstreak performed well, but Freeman was mediocre compared to the experimental lines. Camelot did particularly well. A number of lines show promise for continued testing toward new cultivar releases. The lines in the NTN have less performance history, so it is expected that some experimental lines will out-yield the checks, but most lines will have poorer performance. As in the NIN, there were low but positive correlations among the locations (the best being Clay Center and Sidney). The variation in one location could explain at most 38% of the variation in the other location. However, most locations explained less than 10% of the variation at the other locations. This result again indicated the value of extensive testing in NE.

The data for the 2014 TRP:

2014	Mead	Linc	Ccenter	Nplatte	McCook	Sidney	Alliance	Average	rank	Average	Average	Average
	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Hdate	Hegith	Testwt
name	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	Julian	(in)	lbs/bu
Camelot	37.9	75.4	59.9	38.4	90.2	73.5	62.9	62.6	11	149.12	35.19	61.70
Freeman	28.2	70.2	52.6	48.5	82.0	63.4	67.4	58.9	39	148.15	32.31	61.85
GOODSTREAK	39.3	74.4	53.5	41.0	85.4	74.8	58.3	61.0	21	148.98	40.37	61.90
NE13402	23.8	63.4	40.5	47.8	78.5	56.5	59.4	52.8	58	146.15	28.49	61.20
NE13405	37.7	75.9	64.6	40.1	91.1	75.2	64.1	64.1	4	147.18	32.56	62.60
NE13412	31.8	56.8	42.1	35.0	81.9	61.3	52.4	51.6	59	147.84	34.34	62.03
NE13420	31.3	68.8	52.7	36.5	77.6	65.3	53.6	55.1	53	148.25	33.91	62.55
NE13425	38.3	71.1	61.1	41.9	81.9	67.9	65.5	61.1	19	147.54	32.56	62.38
NE13430	28.2	67.0	54.3	47.1	74.1	66.3	58.6	56.5	50	148.04	35.74	62.08
NE13434	54.1	74.5	64.1	46.9	85.9	74.7	63.1	66.2	1	148.86	33.69	62.03
NE13438	23.9	65.1	59.3	39.1	88.5	72.8	65.8	59.2	35	148.84	30.54	62.83
NE13443	7.2	45.5	40.9	40.1	76.4	60.5	57.9	46.9	60	149.20	29.39	61.85
NE13445	39.0	69.4	61.1	41.9	76.8	78.9	63.6	61.5	16	148.02	35.91	62.08
NW13455	46.5	68.6	62.0	41.7	89.8	74.9	59.3	63.3	8	148.84	34.09	62.30
NW13457	30.4	66.4	55.7	43.6	72.1	77.4	67.6	59.0	38	148.49	34.16	62.85
NW13458	24.4	62.1	53.2	40.9	82.2	71.7	49.6	54.9	55	149.26	34.51	64.30
NE13471	25.5	67.1	50.7	38.3	81.2	56.5	59.0	54.0	57	148.28	33.71	60.95
NW13480	28.6	64.0	53.4	42.9	78.9	68.4	66.6	57.5	47	149.95	31.83	60.30
NE13482	26.5	69.8	57.2	42.2	87.2	64.7	64.2	58.8	40	149.65	34.13	60.60
NE13483V	28.1	62.8	57.5	44.5	88.1	81.1	61.2	60.5	26	149.93	35.00	63.60
NE13484V	24.5	67.0	56.6	39.4	82.0	66.0	50.1	55.1	54	148.97	33.01	61.23
NW13491	20.1	63.7	52.4	50.1	94.5	60.7	55.8	56.8	48	149.86	31.07	62.58
NW13493	31.5	70.9	64.8	47.7	93.9	77.2	57.1	63.3	7	149.63	32.50	62.50
NW13494	32.6	64.2	60.5	44.1	90.9	69.4	60.0	60.2	27	148.98	32.64	62.90
NW13499	31.8	69.0	60.0	38.5	83.9	78.4	51.8	59.1	37	149.51	37.23	62.00
NW13502	34.9	77.2	59.5	40.5	90.1	75.3	60.2	62.5	12	149.40	33.90	62.08
NE13510	39.2	66.3	54.0	37.9	81.0	67.6	50.7	56.7	49	148.84	31.03	61.00
NE13511	26.8	74.2	61.5	51.1	87.9	78.3	59.8	62.8	10	150.02	32.64	62.33
NE13515	31.3	71.3	56.6	33.4	97.0	73.3	67.3	61.5	17	149.00	34.14	62.28
NW13516	27.4	67.7	56.6	43.9	74.7	79.2	71.0	60.1	29	149.65	32.61	60.68
NW13518	30.4	65.6	54.1	45.0	80.0	71.0	61.2	58.2	44	149.80	32.19	60.25
NW13535	29.8	67.9	55.5	42.1	82.8	65.3	49.3	56.1	51	149.47	32.64	62.18
NW13536	32.9	66.3	63.0	41.9	82.6	68.0	58.8	59.1	36	149.33	29.86	62.55
NW13542	42.3	69.6	57.9	42.3	82.4	72.9	52.6	60.0	30	149.77	35.24	62.98
NE13544	39.1	62.4	61.2	49.9	81.6	75.0	47.3	59.5	34	149.67	32.91	62.20
NE13545	23.2	75.3	64.2	43.1	80.6	75.0	55.5	59.6	33	150.16	35.16	62.48
NE13546	35.6	70.3	56.9	38.1	59.6	62.4	59.6	54.6	56	148.97	34.87	60.58
NE13550	30.8	75.4	53.9	44.8	79.3	78.6	56.3	59.9	31	148.13	32.91	62.60
NE13554	23.4	71.5	62.2	51.7	84.8	81.4	66.1	63.0	9	151.63	35.73	62.40
NW13560	36.4	68.1	56.4	42.1	78.0	74.8	70.2	60.9	23	150.40	32.84	60.33
NE13564	24.2	66.7	55.5	39.6	74.6	68.2	60.0	55.5	52	149.16	32.91	62.08
NW13570	37.4	66.5	57.2	48.7	95.6	79.0	53.0	62.5	13	150.00	32.46	61.28
NW13574	33.7	73.6	61.3	41.2	75.8	79.0	67.8	61.8	14	149.65	36.76	62.95
NE13583	31.7	66.7	58.2	39.7	91.4	74.7	61.9	60.6	25	149.63	31.74	61.80
NE13585	32.1	67.7	57.3	39.8	81.5	70.3	61.2	58.6	42	148.80	31.73	60.53
NE13589	33.0	73.2	56.0	42.0	70.6	77.2	66.9	59.8	32	149.70	34.87	62.38
NE13593	31.8	68.7	58.2	43.4	93.2	73.3	60.0	61.2	18	149.40	34.77	62.38
NW13596	33.3	74.2	58.4	41.5	78.8	75.5	58.9	60.1	28	150.07	34.61	60.05
NE13597	25.4	63.7	54.0	52.3	92.9	69.6	69.2	61.0	20	150.02	31.30	61.73
NE13604	25.5	74.2	62.3	49.1	89.5	84.5	72.6	65.4	2	150.85	35.40	62.33
NE13624	32.1	60.4	66.0	43.8	65.3	72.7	64.9	57.9	45	149.36	33.71	62.10
NE13625	51.2	82.2	70.0	40.1	83.0	77.0	53.4	65.3	3	147.70	33.44	62.80
NE13629	22.2	70.2	62.0	30.4	78.5	77.0	64.5	57.8	46	151.08	36.16	61.63
NW13647	18.1	60.8	57.6	49.0	88.0	75.9	61.6	58.7	41	150.22	33.00	63.78
NE13660	24.1	64.5	63.7	47.5	90.3	73.7	62.8	60.9	22	150.63	32.86	62.38
NW13669	28.0	67.8	57.9	54.3	89.8	85.1	64.1	63.9	5	151.03	34.70	61.88
NE13672	34.5	68.9	55.3	47.5	101.5	81.2	56.0	63.6	6	149.34	33.23	60.05
NE13681	25.1	68.5	65.1	29.2	81.0	78.5	62.1	58.5	43	149.38	35.24	62.70
NE13683	27.3	71.6	59.4	50.4	86.5	76.3	59.4	61.6	15	149.69	32.34	63.18
NE13687	17.5	56.8	60.2	52.4	94.0	78.2	65.5	60.7	24	152.71	32.96	61.98
Mean	**30.7**	**68.2**	**57.7**	**43.1**	**83.7**	**72.7**	**60.4**	**59.5**		**149.33**	**33.53**	**62.00**
LSD	9.7	9.5	6.9	11.1	12.0	7.3	9.4	9.4				
CV	16.2	7.2	6.2	15.8	5.9	6.2	9.6	9.6				

The data for the 2013 TRP:

2013 name	Mead Yield bu/a	Lincoln Yield bu/a	C. Center Yield bu/a	McCook Yield bu/a	Alliance Yield bu/a	NE. Avg. Yield bu/a	Rank	KS Yield bu/a	Rank
NE12406	67.7	71.0	73.2	48.0	51.0	62.18	44	55.2	55
NE12408	71.7	75.1	84.9	54.5	54.5	68.14	10	58.2	48
NE12409	72.9	72.1	76.5	48.5	59.7	65.94	29	60.3	36
NE12416	72.7	66.5	72.3	45.2	53.6	62.06	46	61.5	30
NE12417	75.9	75.9	69.2	48.0	62.9	66.38	24	56.1	54
NE12429	78.4	77.0	73.8	47.5	64.0	68.14	11	60.7	34
NE12430	77.1	77.7	82.2	51.5	64.3	70.56	2	60.1	42
NE12435	65.1	70.3	68.6	43.2	56.9	60.82	51	60.2	39
NE12438	74.4	73.1	86.4	48.5	69.4	70.36	4	65.3	10
NE12439	74.3	77.3	79.1	52.5	64.3	69.50	7	66.4	8
NE12443	78.0	79.0	84.6	47.6	56.6	69.16	8	69.2	2
NE12444	73.2	68.3	76.5	50.0	65.9	66.78	21	58.1	49
NE12450	65.0	87.3	76.1	46.5	63.1	67.60	14	61.9	27
NE12456	60.3	71.2	72.7	41.7	56.7	60.52	55	54.3	56
Camelot	73.0	70.6	78.9	48.9	64.7	67.22	18	60.7	34
NE12459	71.7	72.8	72.4	46.6	57.9	64.28	36	62.4	20
NE12461	76.6	82.1	79.1	47.5	54.9	68.04	12	68.5	4
NE12464	75.9	75.6	81.3	44.9	66.4	68.82	9	64.5	12
NE12467	64.3	74.4	70.9	33.8	56.3	59.94	56	54.0	57
NE12480	62.4	60.8	77.9	34.9	61.6	59.52	59	61.1	32
NE12482	68.6	67.2	70.9	34.9	64.2	61.16	50	62.4	20
NE12483V	70.3	63.2	78.2	49.5	69.6	66.16	26	72.9	1
NE12486	70.5	71.3	63.5	37.6	60.5	60.68	53	61.8	28
NE12488	68.9	78.3	75.7	46.4	60.9	66.04	27	60.2	39
NE12503	70.7	78.2	76.4	44.2	66.5	67.20	19	62.4	20
NE12509	69.7	69.4	70.9	49.6	51.0	62.12	45	62.7	19
NE12510	73.4	76.8	78.2	46.7	53.9	65.80	30	65.1	11
NE12518	75.2	70.1	79.6	51.8	59.6	67.26	17	62.4	20
NE12521	63.5	63.1	77.0	42.9	56.4	60.58	54	51.8	59
GOODSTREAK	72.3	61.6	71.1	47.5	61.9	62.88	42	62.1	25
NE12524	75.8	73.4	77.2	55.3	67.3	69.80	6	57.7	50
NE12538	66.7	69.7	67.2	45.3	54.8	60.74	52	64.4	13
NE12539	63.3	69.0	64.6	40.0	55.4	58.46	60	51.5	60
NE12550	69.8	75.4	75.2	39.8	58.2	63.68	38	67.1	6
NE12561	71.7	76.1	80.1	45.2	62.1	67.04	20	59.7	45
NE12563	69.3	73.5	81.5	42.4	57.4	64.82	35	65.5	9
NE12568	73.6	67.6	65.3	42.3	59.5	61.66	48	61.0	33
NE12571	75.0	75.5	76.1	53.7	53.0	66.66	22	66.9	7
NE12578	75.8	72.1	75.7	43.3	52.1	63.80	37	64.4	13
NE12580	71.8	76.1	79.3	56.1	54.3	67.52	15	62.3	24
NE12582	67.6	73.2	74.0	41.9	56.1	62.56	43	53.9	58
NE12583	64.0	71.2	75.2	44.3	55.5	62.04	47	62.0	26
NE12585	68.9	71.3	78.3	46.3	59.6	64.88	33	58.5	47
NE12589	78.5	77.1	86.4	45.0	62.7	69.94	5	67.5	5
OVERLAND	73.6	78.3	84.4	42.5	53.8	66.52	23	59.9	44
NE12595	64.8	61.6	78.3	36.4	58.2	59.86	58	61.8	28

NE12596	64.1	64.1	72.2	39.3	60.0	59.94	56	58.7	46
NE12598	70.1	72.4	76.5	41.7	55.8	63.30	41	56.2	53
NE12630	67.4	65.7	78.6	52.8	65.3	65.96	28	57.7	50
NE12634	70.9	69.4	77.2	50.6	57.2	65.06	32	60.3	36
NE12637	68.4	74.8	80.1	46.8	57.8	65.58	31	63.9	15
NE12639	62.4	65.8	72.9	45.7	60.0	61.36	49	63.4	16
NE12659	74.8	72.2	75.1	45.8	56.5	64.88	34	60.2	39
NE12662	78.8	78.6	81.9	50.9	62.5	70.54	3	63.1	17
NE12668	72.4	74.5	72.2	49.7	63.0	66.36	25	60.3	36
NE12675	69.2	73.9	72.8	44.0	57.2	63.42	40	57.1	52
NE12685	73.7	70.7	73.1	45.9	55.0	63.68	38	61.5	30
NE12686	73.3	75.4	89.5	57.2	61.6	71.40	1	68.8	3
NE12689	72.7	74.1	80.9	47.3	63.2	67.64	13	60.1	42
NH12615	73.2	70.7	84.0	47.2	61.7	67.36	16	63.0	18
MEAN	**70.92**	**72.35**	**76.39**	**46.09**	**59.43**			61.35	
LSD	**8.18**	**7.48**	**9.19**	**8.38**	**9.18**			**5.98**	
CV	**5.96**	**6.37**	**7.44**	**8.89**	**9.52**			**6.01**	
Heritability	**0.99**	**0.99**	**0.7**	**0.99**	**0.97**			**0.99**	

The data for the 2012 TRP:

2012 name	KS (bu/a)	Mead (bu/a)	Linc. (bu/a)	Clay C. (bu/a)	N. Platte (bu/a)	McCoo (bu/a)	Sid (bu/a)	Allian. (bu/a)	Mean (bu/a)	Rank	Flower date
Camelot	41.3	58.0	48.2	50.7	37.7	63.2	63.7	46.0	51.1	52	**125.7**
GOODSTREAK	36.4	49.4	43.2	39.2	31.7	51.5	57.1	48.8	44.7	60	**125.4**
Overland	47.8	76.6	52.0	64.5	42.7	75.4	65.6	51.6	59.5	6	**129.0**
NE11415	66.9	51.7	41.9	51.9	43.4	82.6	63.1	49.6	56.4	16	**117.7**
NE11423	64.0	53.3	42.1	46.4	39.5	66.4	58.4	45.4	51.9	46	**123.1**
NE11426	45.4	65.2	49.7	51.9	41.9	72.4	57.6	47.1	53.9	30	**117.6**
NE11440	61.2	60.7	39.4	55.2	37.0	64.7	60.8	49.2	53.5	36	**122.0**
NE11443	51.9	59.2	46.2	51.4	38.3	60.1	61.4	38.8	50.9	54	**117.6**
NE11455	64.0	63.5	45.4	46.2	39.4	82.2	65.8	40.9	55.9	20	**119.3**
NE11461	60.9	54.8	52.1	47.8	43.3	66.2	62.9	47.7	54.5	25	**122.0**
NE11464	52.7	55.3	49.5	47.1	38.3	77.9	54.2	45.9	52.6	42	**119.7**
NE11470	58.9	55.2	46.5	55.0	44.5	72.2	63.4	51.2	55.9	21	**117.7**
NE11472	62.1	60.6	50.2	58.6	44.1	78.6	60.4	47.2	57.7	12	**119.7**
NE11480	55.1	56.5	47.4	45.7	39.2	68.7	59.6	43.3	51.9	46	**121.5**
NE11482	48.9	59.3	47.7	53.2	43.7	72.7	66.6	52.2	55.5	22	**126.3**
NH11489	60.4	57.7	50.3	55.4	43.7	88.2	64.8	47.1	58.5	9	**123.1**
NH11490	48.2	63.6	49.1	52.5	41.6	75.2	64.6	44.7	54.9	24	**123.7**
NE11499	62.4	67.5	52.4	54.8	40.8	77.9	65.7	46.1	58.5	8	**121.3**
NW11510	67.0	51.1	38.8	49.7	41.6	85.9	57.6	38.4	53.8	32	**117.7**
NW11511	68.1	53.1	48.1	55.3	50.3	88.8	59.1	41.4	58.0	11	**116.1**
NW11514	57.6	61.7	38.0	50.6	40.3	75.0	62.8	45.2	53.9	31	**119.1**
NE11522	52.6	64.1	44.6	48.3	36.9	63.9	55.0	45.1	51.3	49	**121.6**
NE11527	52.2	64.6	51.5	51.4	40.0	69.0	64.3	47.1	55.0	23	**124.4**
NE11530	45.9	63.7	52.6	50.3	35.8	60.8	56.3	49.3	51.8	48	**124.1**
NE11536	41.2	65.9	49.1	61.0	48.6	69.5	65.2	50.6	56.4	16	**127.7**
NE11543	41.2	61.1	50.1	40.8	38.6	67.9	59.0	50.8	51.2	50	**126.7**

NE11560	69.3	60.8	56.8	59.6	53.5	83.3	70.0	48.4	62.7	1	**120.6**
NH11563	56.6	64.4	52.0	51.4	51.1	77.5	65.9	42.6	57.7	13	**126.0**
NH11565	62.6	63.7	57.9	59.5	44.3	85.8	60.0	51.1	60.6	2	**122.7**
NHH11569	56.3	59.0	45.3	54.3	39.6	63.4	58.2	44.9	52.6	41	**122.4**
NE11581	51.7	61.9	48.2	44.9	39.2	64.1	59.8	53.3	52.9	39	**122.0**
NW11588	34.3	62.1	55.3	52.4	41.4	65.4	60.7	50.4	52.8	40	**126.3**
NW11589	33.0	54.1	48.7	45.7	31.4	53.8	57.4	41.2	45.7	59	**124.7**
NW11590	58.8	67.4	54.7	60.0	48.1	81.9	64.6	48.3	60.5	3	**121.9**
NW11593	49.0	55.5	40.9	47.5	39.4	71.9	59.3	45.9	51.2	51	**119.3**
NW11598	61.2	57.2	53.5	57.4	47.0	78.6	68.6	43.3	58.4	10	**123.7**
NE11607	45.9	75.0	59.9	71.6	46.9	73.4	53.9	51.6	59.8	5	**129.4**
NE11608	40.7	65.7	54.3	51.4	40.5	65.9	56.6	50.0	53.1	38	**129.3**
NE11610	32.1	62.0	51.0	57.1	43.9	67.1	62.7	52.2	53.5	37	**127.7**
NE11612	35.7	59.9	56.0	62.9	43.5	64.6	59.8	46.9	53.7	33	**130.0**
NE11613	39.6	59.3	50.7	60.6	41.4	65.0	59.0	43.5	52.4	43	**125.7**
NH11631	44.5	71.0	58.9	47.9	39.8	84.6	59.2	41.5	55.9	19	**129.3**
NHH11638	34.6	71.3	59.6	54.4	47.9	90.0	57.4	46.1	57.7	14	**127.6**
NHH11639	34.6	65.9	56.7	53.6	44.9	83.2	64.8	43.9	56.0	18	**128.9**
NE11642	37.6	66.1	47.2	52.0	37.0	59.6	56.5	51.5	50.9	53	**130.0**
NE11643	40.0	62.5	47.2	67.3	36.9	59.0	59.0	46.5	52.3	44	**129.6**
NW11645	43.8	63.4	52.5	53.8	33.0	66.3	50.3	53.9	52.1	45	**129.0**
NE11652	45.3	69.1	51.1	59.6	39.9	59.6	60.4	49.6	54.3	26	**129.6**
NE11653	27.3	74.4	56.0	60.1	36.7	67.4	62.6	48.9	54.2	29	**128.7**
NE11654	46.6	68.0	63.1	64.9	43.2	71.9	65.4	51.6	59.3	7	**129.2**
NE11655	31.9	65.2	51.9	47.1	38.3	67.9	55.7	44.8	50.4	55	**129.9**
NH11663	37.1	71.3	56.6	50.5	35.4	73.8	63.1	46.4	54.3	27	**130.6**
NH11664	40.0	75.1	52.6	49.9	38.4	72.7	59.5	40.5	53.6	34	**130.4**
NH11668	41.3	73.6	57.9	52.3	39.4	78.8	61.6	47.4	56.5	15	**129.4**
NE11684	32.1	69.6	55.1	64.1	43.2	67.7	54.2	42.6	53.6	35	**130.9**
NE11688	41.6	73.7	61.9	73.3	49.9	70.1	65.4	46.7	60.3	4	**128.3**
NE11690	27.8	60.2	49.1	43.7	33.9	69.1	59.9	42.2	48.2	58	**128.6**
NH11691	35.1	54.4	54.1	45.8	40.1	79.3	46.1	46.3	50.2	56	**130.6**
NW11696	33.4	61.9	46.3	47.4	36.2	63.5	59.0	47.0	49.3	57	**127.6**
NE11697	60.7	56.0	42.8	50.2	44.8	62.7	62.7	54.3	54.3	27	**120.0**
Mean	47.9	62.6	50.5	53.5	41.2	71.4	60.6	46.9	54.3		**124.8**

6. Regional Nurseries

In 2014, we continued to combine the Southern Regional Performance Nursery (SRPN) and the Northern Regional Performance Nursery (NRPN) into one larger nursery. These were planted at Lincoln, North Platte, Sidney , and Alliance. At Clay Center, only the SRPN was planted. To fill out the nursery, we added a few other lines mainly to compare selections out of research for scab tolerance or drought tolerance to determine if they had merit. The NRPN and SRPN data from all locations is available at: http://www.ars.usda.gov/Research/docs.htm?docid=11932. It was useful to see Kharkof and Scout 66, older wheat cultivars, continue to be very low yielding, indicating that breeding progress has been made.

7. Multiple-Location Observation Nursery

All seven locations in Nebraska (Lincoln, Mead, Clay Center, North Platte, McCook, Sidney, and Alliance) were planted and harvested. To better estimate the yield at key locations, two replications were planted at Lincoln, North Platte, and Alliance. An additional location was collaboratively planted and harvested in Kansas. The Kansas site was very high yielding due to it being treated with fungicides and given very high fertility–to maximize grain yield. The eight locations (seven in NE and one in KS) were used for selection. The table below gives the grain yields for all of the harvested locations, the line average, and the rank of the top 10 highest yielding lines**.** In this nursery, we continued to use marker-assisted selection for line advancement. For the fourth year, we used genotyping by sequencing (GBS). Genotyping by sequencing was done in collaboration with Dr. Jesse Poland, KSU, because it is much less costly (less than 1/3 of the cost of other marker systems). We will continue to do to this and have secured funding to do this on earlier generation material. One novel twist thatDr. Poland added was we are now reanalyzing the GBS data over years, thus creating a "training" population and tying all our datasets together. Genotyping has many missing data points, but this approach has really helped us understand our materials. The 2014 data were quite interesting because were we able to look at phenotypic data (our traditional selection protocol), as well as the current year estimated breeding values (EBVs=EBV1) and those developed over four years (= EBV4). By comparing and selecting on phenotypic values, EBV1 and EBV4, our hope is not to lose a promising line. In theory, EBV4 and phenotypic selection should be the best. One change that we will add is a stratified selection, where we will ensure that the highest-yielding tall wheat lines, disease resistant wheat lines, etc., are retained. By predominantly selecting on grain yield, plant breeders tend to select semi-dwarf lines. The top ten lines out of 270 experimental lines are below:

2014	Mead	Linc	C.Cent.	N. Platte	McCook	Sidney	Alliance	KS	Average	Rank
	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield	
Names3	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	
NE14658	47.5	74.7	65.5	47.6	88.6	68.1	70.4	71.5	66.7	1
NE14537	49.3	74.8	58.9	50.7	97.4	73.8	64.3	64.3	66.7	1
NE14434	50.2	78.6	61.5	54.7	92.1	72.9	64.7	57.3	66.5	3
NE14606	39.3	72.1	59.9	52.7	97	82	61.1	66.8	66.4	4
NE14531	43.9	80.4	62.6	53.9	81.1	84	63.8	58.4	66	5
NE14696	34.4	79.5	68.1	40.6	91.5	72.6	69.5	70.6	65.8	6
NE14607	46.6	68.3	65	45.6	97.2	76.8	66.8	59	65.7	7
NE14401	41.6	63.6	59.4	51.1	73.3	78.9	71.7	84.3	65.5	8
NE14656	42.7	70.7	62.9	53.5	106.3	56.2	68.3	59.7	65	9
NE14647	45.8	65.3	60.6	54.1	101.8	68.9	67	55.4	64.9	10

Camelot ranked 26 in this trial. Freeman ranked 50. Goodstreak ranked 88.

8. Early Generation Nurseries

a. Single-plot Observation Nursery

Fourteen hundred and eighty-six lines were evaluated at Lincoln in 2014. Of the 1486 lines and checks, 1268 were red and 218 were white seeded or mixed red and white seeded. The lines included 71 one and two-gene herbicide tolerant lines (mainly two gene), 193 possible FHB tolerant lines, 92 possible lines with WSMV tolerance, and 83 Hessian fly-tolerant lines. In addition, 68 Clearfield observation plots were planted. All 1554 lines were harvested, to get better information than through visual selection. Those lines with acceptable

yield were then test weighed and if the test weight was good, their protein was measured. Five hundred lines with good yield, test weight, and protein content were sent to the Seed Quality Laboratory for micro-quality evaluations. Two hundred seventy lines were advanced. We will try to be more selective in this nursery so that harvesting all the plots will be very efficient.

b. Headrow Nursery

In 2013-14, 48,100 (of which 4,000 were herbicide-tolerant) headrows were planted at Lincoln. In general, the headrow nursery was a little larger than normal. We harvested more than1800 lines which were planted in 2014-2015. Fifteen hundred forty-four were selected for advancement. From the imi-headrows, 377 were selected for advancement. The main selection criteria for discarding headrows was black point or poor seed quality. Of the red and white wheat lines, 238 were sent to Scottsbluff for planting in our irrigated observation nursery.

c. F_3 bulk hybrids

The F_3 bulk hybrid nursery contained 1108 red, red and white segregating, or white seeded bulks. In addition, we planted 54 herbicide-tolerant bulks (planted at Lincoln). Most bulks were planted at Mead (our main and best winter killing site) and many of those were planted at Sidney as a backup site in case of disaster at Mead. The number of F_3 bulks is high and we intend to reduce it in future. Over 50,600 head rows were selected for fall planting in 2014 and were planted on time. In general, their emergence and stands were very good in the fall, but a heavy rain right after part of the field was planted led to washing and plot mixing. The project goal remains to have sufficiently good segregating F_3 material to select about 40 - 45,000 headrows.

d. F_2 bulk hybrids

The F_2 bulk hybrid nursery contained 1063 bulks and check plots that were planted at Mead. Fifty-eight F_2 bulks with two genes for herbicide resistance were planted at Lincoln for selection. The bulks generally survived the winter, but some were winterkilled (those involving winter tender parents). We continued not sharing our bulk populations this year as the new Wheat Workers Material Transfer Agreement (WWMTA) requires prior approval of bulk sharing for any subsequent segregating generation. There is no approved bulk sharing form attached to the WWMTA and the paperwork will continue to a major hurdle. As such, the path of least resistance is simply to not share bulks except with those who we have pre-existing bulk-sharing agreements (e.g. CIMMYT). No bulk is shared that includes parental germplasm that requires approval. While this curtailment of bulk sharing is unfortunate and in many ways a waste of resources (groups making the same crosses or not having access to crosses they wished they had made), the alternative concern is that some programs prefer not to share their segregating germplasm with other institutions and businesses.

9. Winter Triticale Nursery

In 2014, one new triticale line (NT06427) was recommended for release. Also, we selected additional lines for increase as possible replacements or to complement NE426GT, NE422T, and NE441T (a licensed line) which continue to perform well. Because triticale is a small market crop, we are carefully deciding how best to release new triticale cultivars so as to not cause inventory problems with the previously released cultivars. Our current thoughts are that we will most likely partner with a triticale seed supplier to merchandise our next release. We also expanded our collaborative testing area into New York, Kansas, and New Mexico.

NT06427 is a winter triticale (x Triticosecale Wittmack) cultivar developed cooperatively by the

Nebraska Agricultural Experiment Station and the USDA-ARS and released in 2014 by the developing institutions. It was released primarily for its awnletted spike, good grain yield, and good forage yield when compared to currently grown triticale cultivars. It is adapted to rainfed triticale production systems in Nebraska and in adjacent states. NT06427 will be licensed with the expectation that the name will emphasize the short awns on the spike as it is considered a valuable trait in forage small grains because feeding small-grains hay with long awns is a mouth irritant and affects hay consumption.

NT06427 was selected from the cross NE96T431/Titan where the pedigree of NE96T431 is TSW250783//GWT88-12/LAD285. The cross was made in 2000. The F_1 generation was grown in the greenhouse in 2001 and the F_2 to F_3 generations were advanced using the bulk breeding method in the field at Lincoln from 2002 to 2003. In 2004, single F_3-derived F_4 rows were planted for selection at Lincoln. There was no further selection thereafter. The $F_{3:5}$ was evaluated as a single four-row plot at Lincoln in 2005. NT06427 was identified in 2006 as the experimental lineand selected for further testing in multi-location trials (Lincoln, Mead, and Sydney). Thereafter it was tested in multi-location replicated trials at the same three Nebraska locations.

NT06427 was evaluated in Nebraska-replicated yield nurseries starting in 2007 for grain yield. In 2008, limited forage trials began. In the Nebraska Triticale Grain and Forage Nurseries (2008 to 2013, Table 1), NT06427 was compared to previous released cultivars NE422T, and NE426GT. NT06427 had significantly higher grain yield (3718 lba/a) than NE422T and was not significantly lower in grain yield than NE426GT. For forage yield (cut approximately 10 days after flowering), NT06427 was not significantly lower yielding (8112 lbs/a) than NE422T or NE426GT.

Other measurements of performance from comparison trials indicate that NT06427 is medium early in maturity (flowering 139 days after Dec. 31), most similar to NE426GT and 4 days earlier than NE422T, which is considered maturity late-maturing line. NT06427 is mid-tall triticale slightly shorter than NE426GT and significantly shorter than NT4422GT. In the two trials where winter injury occurred, NT06427 was not significantly different (78% winter survival) from NE422T and NE426GT, hence, these lines would be considered comparable to the currently grown triticale cultivars. Historically winter triticale is not as winter hardy as the more winter hardy winter wheat cultivars, but in most years and locations in Nebraska, winter injury is minor.

Triticale has few diseases in Nebraska and there are no regional nurseries, so there is little disease or insect data to report. NT06427 was tested in Kenya in 2012 and scored as 1 (on a 0 to 100 scale with 0 being low) for stem rust (caused by *Puccinia graminis Pers.: Pers. f. sp. tritici* Eriks & E. Henn.) using the races common to Kenya (TTKSK and its derivatives). In the same trial, popular wheat (*Triticum aestivum* L.) cultivars (Jagger, 50-60; Scout 66 known to contain Sr_2, 55/20; and Overland believed to contain Sr_{tmp}, 10) scored higher. NT06427 was also scored in Kenya for field races of stripe rust (caused by *P. striiformis* Westendorp f. sp. t*ritici*) and scored as moderately resistant. In Nebraska, when leaf (caused by *P. triticina* Eriks,) stripe, or stem rust were present on wheat, NT06427 would be considered as resistant. In years of high infection of ergot (caused by Claviceps purpurea (Fr.) Tul.), NT06427 has had very low infections. During its selection, lines with ergot are routinely discarded.

In positioning NT06427, based on performance data to date, it should be well adapted to most rainfed wheat production systems in Nebraska and in adjacent areas of the Great Plains where grain or forage triticale are grown. In limited testing outside of Nebraska, NT06427 is competitive to other Nebraska developed cultivars. NT06427 has not been tested under irrigation.

NT06427 is an awnletted, ivory-glumed cultivar. The coleoptile color is white. Its field appearance is most similar to NT0426GT, but can be easily separated from NE426GT because NE426GT is awned. The flag leaf is recurved and twisted at the boot stage. The foliage is green with a waxy bloom on the leaf sheath. The auricle is colorless or white and lightly pubescent. The neck is pubescent (hairy). The head is oblong and mid-dense. The glume is pubescent, white, long, and the glume shoulder is wanting. The beak has an acuminate tip. Kernels are amber colored, elliptical in shape, moderately wrinkled, with a large and

long brush. NT06427 was licensed to Ehmke Seeds and is expected to be marketed under the name Short Beard Thunder.

Development team: P. S. Baenziger (breeder-inventor), K. Vogel, S. Wegulo, T. Regassa, D. Santra, and G. Hein.

In 2014, six lines (including NE426GT and NE422T) were recommended for increase or re-increasing. It appears that NE422T has good forage potential for the southern Great Plains. We are beginning to move to higher and more consistent grain yield levels, but identifying excellent forage types requires forage harvesting which is expensive and difficult for widespread trials. Though the markets for biofuels fluctuate with the price of oil and other geologically based fuels, we believe that there is a future for triticale in a biobased energy system. Triticale can be grown over the winter as forage or grain crop in areas where maize cannot be grown successfully. The grain will substitute for maize in animal rations and the forage can be used as forage, cellulosic ethanol feed stocks, or as a ground cover.

The 2014 grain yields from Nebraska are:

2014	Linc.	Mead	Sidney	Average	Rank	Bacterial	Winter	Height
	Yield	Yield	Yield	Yield		Streak	Survival	
Name	lbs/a	lbs/a	lbs/a	lbs/a		(1-9)	%	in
NT01451	3190	2368	3891	3150	8	3.3	100	44.1
NT05421	3641	3047	3829	3506	1	3.7	99	51.8
NT06422	3557	2476	3802	3278	5	4.5	99	48.1
NT06427	3314	1926	3742	2994	12	3.1	99	44.9
OVERLAND	3446	3019	3875	3447	2	1.8	98	36.1
NT07403	3773	2129	3481	3128	10	5.0	99	43.3
NT09423	3223	2663	3936	3274	6	2.0	100	44.6
NT10417	2291	1957	3912	2720	22	3.9	100	45.2
NT11406	3203	1697	3789	2896	14	3.0	100	44.9
NT11410	3380	1691	3440	2837	17	4.3	98	44.9
NT11428	3389	2399	3416	3068	11	3.3	100	51.5
NT12403	3258	2441	4005	3235	7	6.0	100	44.4
NT12404	3293	1868	3535	2899	13	6.1	100	43.9
NT12406	3155	2412	3859	3142	9	6.4	99	46.8
NE422T	2844	2034	3136	2671	24	4.2	100	56.9
NT12412	3008	1837	3348	2731	20	3.4	98	44.3
NT12425	3496	1956	3172	2875	15	3.0	100	51.7
NT12440	1936	1201	2910	2016	29	4.4	95	40.9
NT13403	2746	1819	3722	2762	18	5.8	99	45.4
NT13405	2259	1301	3548	2369	28	5.1	97	46.4
NT13410	2775	1812	3506	2698	23	6.3	99	47.5
NT13411	2305	1352	3563	2407	27	5.1	97	45.2
NT13412	1232	1195	3487	1971	31	4.7	91	44.5
NT13416	3444	2579	3977	3333	4	5.8	100	49.2
NE426GT	2588	2195	3499	2761	19	5.7	99	44.7
NT13420	2794	2051	3341	2729	21	6.8	99	44.7
NT13421	1817	1256	2909	1994	30	5.1	98	38.9
NT13429	2250	1720	3790	2587	26	4.8	99	47.9

NT13430	2514	1835	3627	2659	25	3.9	100	42.9
NT13443	4053	2761	3473	3429	3	3.4	99	56.3
GRAND MEAN	**2939**	**2033**	**3584**	**2852**	**16**	**4**	**99**	**46**
LSD	464	510	479			2		
CV	10	15	8			23		

The 2014 forage yields from Nebraska (thanks to Dr. Rob Mitchell, USDA-ARS) are:

entry	name	winsur	hdatejulia	height	yldlbsa	Rank	dmpercent	nitrogen	ivdmd	ndf	adf	adl
		%	After 12/31	in	lbs/a		%	%	%	%	%	%
1	NT01451	100	151	41.9	5645	9	26.8	1.92	71.33	61.07	34.95	5.13
2	NT05421	100	150	46.8	5587	11	29.3	1.67	69.11	62.02	36.19	5.35
3	NT06422	100	148	46.2	5489	15	29.9	1.80	71.53	58.58	33.63	5.01
4	NT06427	100	150	44.0	5985	6	28.4	1.75	70.10	60.32	35.00	5.15
5	OVERLAND	100	147	36.0	6059	5	29.0	1.90	71.53	60.46	34.51	5.09
6	NT07403	90	147	41.0	4896	21	31.2	1.68	69.81	60.15	34.72	5.05
7	NT09423	100	151	41.5	6569	2	27.0	1.86	70.80	61.10	35.16	5.24
8	NT10417	100	152	41.2	5189	18	26.6	1.87	71.11	61.68	35.38	5.19
9	NT11406	100	152	42.0	5348	16	28.2	1.71	70.69	59.70	34.51	5.02
10	NT11410	100	149	41.1	5598	10	28.2	1.79	70.91	59.74	34.44	5.14
11	NT11428	100	151	48.9	6244	3	27.8	1.75	70.77	61.73	35.46	5.14
12	NT12403	100	148	42.7	4964	19	29.5	1.73	69.61	59.85	34.89	5.10
13	NT12404	100	148	40.3	4825	22	30.8	1.59	69.23	59.20	34.45	4.96
14	NT12406	100	149	44.4	5863	8	29.3	1.87	69.74	59.22	34.08	5.17
15	NE422T	100	151	54.0	6241	4	27.3	1.74	69.29	63.44	37.04	5.19
16	NT12412	100	150	43.1	5294	17	28.6	1.81	70.83	59.40	33.89	4.93
17	NT12425	100	150	49.4	5923	7	29.1	1.57	69.40	61.43	35.68	5.05
18	NT12440	99	150	36.6	3051	28	28.7	1.99	72.42	58.46	32.97	4.83
19	NT13403	100	148	40.1	4028	25	29.6	1.75	71.04	58.41	33.41	4.96
20	NT13405	99	149	43.0	3015	29	28.5	2.00	71.43	59.98	34.03	4.93
21	NT13410	100	151	41.3	4070	24	28.1	1.93	71.43	59.05	33.53	5.04
22	NT13411	100	148	38.3	3907	26	28.4	1.79	70.49	58.77	33.74	4.99
23	NT13412	99	153	39.3	2599	30	26.7	2.08	70.93	61.38	34.56	5.05
24	NT13416	99	148	45.6	5557	13	30.7	1.70	70.62	58.42	33.06	4.95
25	NE426GT	100	150	42.7	5530	14	28.7	1.71	70.28	60.49	34.78	5.09
26	NT13420	100	148	42.2	4908	20	28.9	1.65	69.91	60.08	34.89	4.96
27	NT13421	96	153	34.9	3107	27	26.6	2.10	71.96	60.72	34.38	5.10
28	NT13429	99	152	44.8	4440	23	25.9	1.95	71.27	62.45	35.62	5.35
29	NT13430	100	150	40.1	5571	12	27.3	1.77	70.77	59.71	34.10	5.05
30	NT13443	100	150	54.4	7069	1	31.4	1.55	69.59	61.36	35.66	5.18
	MEAN	99.3	149.78	42.9	5086		28.6	1.80	70.60	60.28	34.62	5.08
	LSD	5.5	1.3	2.5	917		1.6	0.22	1.79	1.87	1.47	0.21
	CV	3.9	0.62	4.2	13		3.879	8.75	1.80	2.19	3.02	2.99

These trial results indicate that: 1. triticale produces more biomass and grain yield generally than wheat; 2. there is considerable GxE for forage yield; and 3. it very difficult to couple grain yield with forage yield. The comparison likely was affected by different stages of harvest as seen by the different dry matter contents.

Of the lines tested in all the grain and forage trials, NT09423 had good grain yield across the state, excellent forage yield in eastern NE. This highlights the need for testing our forage triticale lines in grain and forage trials across and beyond Nebraska.

The forage results from New York in 2014 are:

Year	Line	stage	% Dry Matter	DM T/A
2014	NE422T	early 10	13.60%	4.86
2014	NT01451	late 9	14.70%	4.87
2014	NT05421	9	13.40%	4.26
2014	NT09423	early 10	14.60%	4.99

The 2013 forage data from Sidney NE (thanks to Dr. Dipak Santra) are:

name	foragedry	Rank
	lbs/a Dry	
NE422T	5920	2
NT06427	5594	4
NT01451	5030	5
NT05421	6325	1
NT07403	4844	8
NT12403	4693	9
NT06422	5631	3
NT11406	3696	10
NT11428	4884	7
NE426GT	4964	6
MEAN	5158	
LSD	1049	
CV	16.89	

The 2013 grain yields from Nebraska and a collaborative site in Kansas are:

	Llincoln	Llincoln	Lincoln	Llincoln	Mead	NEB.	Rank	Kansas	NE + KS	Rank
2013	Height	Heading Date	Grain Yld	Test Weight	Grain Yld	Avg. Yield		Grain Yld	Avg. Yield	
name	(in)	Julian	Lbs/a	Lbs/bu	Lbs/a	Lbs/a		Lbs/a		
NE422T	60.3	150	2622	50.09	3826	**3224.0**	23	2512	**2986.5**	23
NE426GT	48.7	148	2482	47.16	3180	**2831.0**	29	2810	**2824.0**	29
NT01451	49.0	149	2641	47.30	3482	**3061.5**	26	2474	**2865.7**	26
NT05421	57.3	149	3550	50.89	4620	**4085.0**	7	2964	**3711.5**	7
NT05429	48.7	147	3870	48.85	3692	**3781.0**	13	2467	**3342.9**	13
NT06422	51.7	148	4186	47.49	3854	**4020.0**	9	2691	**3577.1**	9
NT06427	49.7	148	3005	46.86	3566	**3285.5**	22	2447	**3006.1**	22
NT07403	48.0	146	4291	52.14	4652	**4471.5**	3	2424	**3789.2**	3
NT09404	53.3	148	3116	47.82	3689	**3402.5**	18	2475	**3093.4**	18
NT09423	50.0	149	3768	49.88	4298	**4033.0**	8	2586	**3550.7**	8
OVERLAND	42.0	150	2867	58.71	3859	**3363.0**	19	2527	**3084.4**	19
NT10417	52.3	148	3429	45.53	3960	**3694.5**	16	2275	**3221.2**	16
NT10429	55.7	149	3274	51.57	5055	**4164.5**	6	2124	**3484.2**	6
NT10441	48.7	149	3532	48.30	3964	**3748.0**	14	1880	**3125.3**	14
NT11404	53.0	148	3411	47.16	3195	**3303.0**	21	2403	**3003.0**	21
NT11406	48.7	149	3342	46.58	3929	**3635.5**	17	1712	**2994.4**	17
NT11410	51.0	147	3763	47.34	4131	**3947.0**	10	1609	**3167.8**	10
NT11428	55.3	149	3708	49.03	3996	**3852.0**	11	1966	**3223.4**	11
NT11444	56.3	150	3276	48.91	4191	**3733.5**	15	3170	**3545.7**	15
NT12403	50.0	147	4002	53.28	4902	**4452.0**	4	2515	**3806.3**	4
NT12404	49.3	146	4230	49.95	4812	**4521.0**	2	2602	**3881.4**	2
NT12406	50.7	147	3728	50.36	3964	**3846.0**	12	1985	**3225.7**	12
NT12411	46.0	148	2275	46.20	3683	**2979.0**	28	2760	**2906.0**	28
NT12412	52.3	149	2784	48.82	3875	**3329.5**	20	2532	**3063.6**	20

The 2013 forage yields from Nebraska (thanks to Dr. Ken Vogel, USDA-ARS) and collaborative sites in Kansas and Oklahoma are:

	Mead	KS	OK		Rank
2013	Forage	Forage	Forage	Aver	Forage

	YLD	YLD	YLD	For	
name	lbs/a	lbs/a	lbs/a	lbs/a	
NE422T	8502	6975	2859	6111.8	15
NE426GT	8700	7827	4084	6870.3	2
NT01451	8385	8669	3403	6819.1	3
NT05421	8944	7502	3403	6616.4	7
NT05429	8864	6401	3539	6267.9	11
NT06422	8725	8803	4220	7249.2	1
NT06427	8597	6517	3539	6217.6	13
NT07403	8528	4874	3948	5783.3	21
NT09404	8154	5490	4220	5954.6	17
NT09423	7955	5711	4084	5916.4	18
OVERLAND	7156	3402	2723	4427.0	24
NT10417	8239	6874	3675	6262.8	12
NT10429	8916	6097	3812	6274.9	10
NT10441	8894	5659	3948	6166.8	14
NT11404	8282	7010	3948	6413.3	9
NT11406	7883	5674	3403	5653.5	23
NT11410	8859	7306	3403	6522.7	8
NT11428	8745	5045	3812	5867.0	19
NT11444	8652	5345	3403	5800.0	20
NT12403	8706	5679	3812	6065.4	16
NT12404	8214	5435	3539	5729.5	22
NT12406	8885	6642	4356	6627.5	6
NT12411	7969	8787	3675	6810.5	4
NT12412	8608	7666	3812	6695.3	5

The forage results from New York in 2013 are:

Variety	T/A DM
NT05429	3.56
NT06422	4.00
NT07403	2.88
NT0422T	3.61

The 2013 forage data from Sidney NE (thanks to Dr. Dipak Santra) are:

2013 Name	Height in	Forage DM Lbs/a	Rank	Dry Matter %
NE422T	52.4	4885	3	0.325
NT01451	39.5	4467	8	0.337
NT05421	47.3	5184	1	0.358
NT05429	41.3	4547	5	0.34
NT06422	41.0	4294	9	0.336
NT06427	40.3	5156	2	0.357
NT07403	42.5	4494	7	0.358
NT09404	42.0	4873	4	0.347
NT10429	46.0	4514	6	0.345
NT10441	40.0	4093	10	0.342
Avearge	43.21	4650.5		0.344
LSD	7.0	535.8		0.019
CV	11.1	7.9		3.9
Heritability	0.33	0.41		0.29

The 2012 forage results from Wisconsin were:

Variety		Seeding Rate (seeds/packet)		Yield Kg/ha	Rank
NE03T416		4400		4954	5
NT01451		4400		4813	7
NT05421		4400		5135	4
NT05429		4400		5215	2
NT06422		4400		5465	1
NT06427		4400		4862	6
NT07403		4400		5157	3
815		4400		4558	8

815 is a local check and it is clear that our lines can compete with the local lines in Wisconsin based on this year's data.

The forage data from North Platte in 2012 are (thanks to Dr. Jerry Volesky):

Triticale Plots 2012	
	2012
Entry	**- - - Tons/acre - - -**
Wheat Border	5.07
1010 Triticale	5.39
NT05429	5.97

NE03T416	6.08
Syn Exp	6.20
NT07403	6.21
NT05421	6.23
NT06427	6.23
NT06422	6.39
TriCal 348	6.58
ATR-626	6.59
NE422T	7.17
NT01451	7.29

Again our lines did very well compared to the local check 1010 Triticale.

The results for the 2012 forage trial at Sidney were (thanks to Dr. Dipak Santra):

name	Yield	NDF	ADF	Prot	RFV	TDN
	lbs/a					
GOODSTREAK	6312	54.6	35.6	11.8	104	62
NE422T	6193	52.15	32.8	11.4	113	65.2
NE426GT	6212	53.75	35.6	10.75	106	62
NT01451	6786	53.95	34.2	12.1	108	63.6
NT05421	6863	54.4	34.15	11.15	107	63.6
NT06427	6793	56.8	36.4	11.5	100	61.1
NT07403	6200	54.8	34.55	12.05	105	63.2
NT09404	7114	54.9	35.15	11.4	104	62.5
NT09423	6905	57.2	37.85	11.6	97	59.4
NT10441	7065	56.2	36.7	11.3	100	60.8
NT10418	7016	56.85	36.15	11.5	100	61.3
NT10429	6319	55.3	35.3	11.35	103	62.3
GRAND MEAN	6648.19	55.08	35.37	11.49	103.63	62.23
LSD	1240.4	3.33	2.71	1.52	9.04	3.06

The results for the 2012 forage triticale trial at Mead, NE are (thanks to Dr. Ken Vogel):

Name	Yield	IVDMD	NDF	ADF	ADL	NITROGEN	DM %
	Lbs/a						
OVERLAND	10108	70.22	54.45	31.65	4.39	1.55	0.4
NE422T	12454	68.6	61.44	36.89	5.04	1.36	0.34
NE426GT	12951	70.48	56.05	32.19	4.38	1.47	0.34
NT01451	12521	69.72	58.58	34.56	4.77	1.48	0.33
NE03T416	11809	70.99	54.77	32.69	4.37	1.38	0.35
NT05421	12638	68.59	58.61	34.62	4.81	1.39	0.35
NT05429	11780	70.88	52.51	31.36	4.16	1.39	0.37
NT06422	11863	70.46	53.42	31.72	4.29	1.39	0.38

NT06423	12090	68.26	57.81	34.59	4.8	1.4	0.36
NT06427	12372	69.58	56.72	33.41	4.51	1.44	0.35
NT07403	13075	71.14	52.02	30.42	4.02	1.44	0.4
NT08414	13083	69.22	56.13	33.59	4.48	1.37	0.33
NT08425	12359	70.43	54.79	32.07	4.31	1.47	0.35
NT09404	12892	70.1	56.79	33.36	4.64	1.57	0.34
NT09423	11698	69.67	58.38	34.4	4.63	1.49	0.33
NT10444	12955	70.93	54.49	32.26	4.4	1.44	0.35
NT10441	11509	69.83	55.79	32.37	4.52	1.41	0.35
NT10417	12236	70.32	55.5	33.11	4.44	1.31	0.36
NT10418	12670	69.1	56.56	33.28	4.41	1.37	0.36
NT10429	11199	68.29	59.09	34.93	4.64	1.45	0.36
NT10443	11951	68.24	61.18	37.01	4.87	1.36	0.35
NT11404	12088	70.02	56.46	33.3	4.54	1.5	0.34
NT11406	12924	69.98	57.33	33.68	4.59	1.38	0.33
NT11408	13906	69.67	55.87	33.2	4.51	1.39	0.35
NT11410	12771	70.1	55.73	33.53	4.47	1.36	0.34
NT11419	12596	68.6	57.78	34.15	4.74	1.27	0.35
NT11428	13220	68.73	59.29	34.97	4.62	1.42	0.34
NT11430	13203	70.49	55.66	32.76	4.39	1.32	0.35
NT11438	12609	69.05	57.14	34.3	4.6	1.32	0.35
NT11444	13567	68.18	59.06	35	4.54	1.32	0.35
GRAND MEAN	12437	69.66	56.65	33.51	4.53	1.41	0.35
LSD	1588	1.63	2.54	1.62	0.31	0.19	0.02
CV	9.05	1.65	3.18	3.42	4.9	9.75	4.07

The results for the 2012 grain triticale trials are:

	Grain Yield (lbs/a)	Grain Yield (lbs/a)	Grain Yield (lbs/a)	**State Avg Yield lbs/a**	**Rank**	**State Avg. Hdate (d after Jan.1)**	**State Avg. Height (in)**
name	Linc.	Mead	Sidney				
Overland	3100	4127	3139	**3455**	**25**	**129.7**	**38.0**
NE422T	3965	3732	1868	**3188**	**28**	**131.0**	**55.0**
NE426GT	4497	4593	3213	**4101**	**4**	**128.2**	**46.3**
NT01451	4312	4152	2785	**3750**	**20**	**129.5**	**44.5**
NE03T416	4520	4327	2708	**3852**	**14**	**122.2**	**46.8**
NT05421	4380	4680	2569	**3876**	**12**	**124.8**	**49.9**
NT05429	4087	4392	2967	**3815**	**17**	**121.2**	**43.4**
NT06422	4421	4794	3061	**4092**	**6**	**121.7**	**48.2**
NT06423	4266	4045	3235	**3849**	**16**	**128.2**	**48.9**
NT06427	4161	3880	2781	**3607**	**23**	**125.2**	**44.5**
NT07403	4482	4200	3372	**4018**	**9**	**119.4**	**45.0**
NT08414	3886	4369	2944	**3733**	**21**	**127.5**	**44.4**

NT08425	4392	4222	3106	**3907**	**11**	**128.0**	**47.2**
NT09404	4334	4392	2865	**3864**	**13**	**129.2**	**48.4**
NT09423	4826	5060	3183	**4356**	**1**	**129.9**	**44.6**
NT10444	4191	3960	3118	**3756**	**18**	**125.5**	**45.0**
NT10441	4516	4551	3086	**4051**	**7**	**129.0**	**45.3**
NT10417	4597	4964	2993	**4185**	**3**	**125.5**	**46.8**
NT10418	4128	3765	2319	**3404**	**27**	**124.0**	**51.3**
NT10429	4154	3695	2377	**3409**	**26**	**129.9**	**52.9**
NT10443	3760	3143	1678	**2860**	**30**	**131.4**	**50.8**
NT11404	4517	4586	2989	**4031**	**8**	**126.5**	**44.7**
NT11406	4747	4956	3075	**4259**	**2**	**129.4**	**46.6**
NT11408	4361	4472	2714	**3849**	**15**	**125.9**	**51.4**
NT11410	4276	4643	2960	**3960**	**10**	**126.5**	**44.3**
NT11419	4354	3575	2926	**3618**	**22**	**129.3**	**50.2**
NT11428	5144	4492	2662	**4099**	**5**	**129.2**	**50.9**
NT11430	4008	4328	2280	**3539**	**24**	**127.2**	**49.7**
NT11438	3595	3901	1544	**3013**	**29**	**129.0**	**52.1**
NT11444	4638	4244	2371	**3751**	**19**	**130.7**	**52.0**
LSD	865.19	678.46	538.78				
CV	10.23	9.64	11.93				
MEAN	**4287**	**4275**	**2763**	**3775**		127.1	47.6

The three-year (2012-2014) grain-yield data summary for locations where we were able to harvest trials is presented below:

2012-2014	Hdate (d after Jan.1)	Grain Yield (lbs/a)	Height (in)	Hdate (d after Jan.1)	Grain Yield (lbs/a)	Height (in)	Grain Yield (lbs/a)	Height (in)	**State Avg Yield lbs/a**	**Rank**	**State Avg. Hdate (d after Jan.1)**	**State Avg. Heigh (in)**
name	Linc.	Linc.	Linc.	Mead	Mead	Mead	Sidney	Sidney				
NE422T	139.0	3143.7	58.2	134.0	3197.3	57.4	2502.0	51.6	3003.4	13	131.0	56.0
NE426GT	135.9	3189.0	49.1	132.7	3322.7	46.8	3356.0	42.6	3280.9	12	128.2	45.5
NT01451	137.9	3381.0	47.3	132.3	3334.0	47.1	3338.0	40.8	3352.6	10	129.5	44.3
NT05421	136.2	3857.0	54.6	126.3	4115.7	51.7	3199.0	46.2	3789.5	3	124.8	50.9
NT06422	132.9	4054.7	49.9	125.7	3708.0	52.5	3431.5	44.1	3768.9	4	121.7	48.2
NT06427	134.4	3493.3	47.1	129.7	3124.0	45.4	3261.5	43.7	3296.9	11	125.2	44.7
NT07403	129.5	4182.0	47.1	125.7	3660.3	46.6	3426.5	42.3	3797.5	2	119.4	44.2
NT09423	137.9	3939.0	48.0	133.0	4007.0	47.2	3559.5	40.8	3869.6	1	129.9	44.6
NT10417	135.9	3439.0	51.1	127.3	3627.0	48.1	3452.5	42.4	3512.9	8	125.5	46.0
NT11406	137.5	3764.0	49.4	132.7	3527.3	46.0	3432.0	43.8	3592.3	6	129.4	45.8
NT11410	135.5	3806.3	48.6	129.0	3488.3	46.5	3200.0	40.3	3535.5	7	126.5	44.6
NT11428	137.4	4080.3	54.7	132.7	3629.0	50.0	3039.0	48.8	3650.8	5	129.2	51.2
Overland	139.2	3137.7	38.4	131.0	3668.3	44.7	3507.0	34.7	3429.0	9	129.7	37.1

It is clear that we have made great progress in grain yields in triticale and that normally triticale has a higher grain yield than winter wheat. Marketing remains the major limitation to improving triticale's impact in modern agriculture.

10. Collaborative Research on Wheat Diseases

Dr. Stephen Wegulo, Department of Plant Pathology, and his staff continue to inoculate our experimental lines with wheat stem rust and Fusarium head blight (FHB, research funded by the U.S. Wheat and Barley Scab Initiative), and as time permits with wheat leaf rust. We continue to improve the greenhouse tests for

stem rust. With the advent of the new race of stem rust, Ug99 (which can overcome some of the previously very durable resistance genes in wheat which were the main genes used in our program), we have greatly increased our efforts to introgress and pyramid new genes with our existing genes. (*Sr2, SrAmigo, SrTmp, SrR, Sr6, Sr22, Sr 24, Sr25, Sr26, Sr 36, Sr39,* and *Sr 40*).

Work continues on introgressing the resistance from *Agropyron* (*Wsm1*, the first real resistance/tolerance to wheat streak mosaic virus [WSMV] developed by Dr. Joe Martin, Kansas State University at Hays, KS and his co-workers) into adapted wheat varieties. The newer source for resistance/tolerance, *Wsm2*, developed by Scott Haley (CSU) in collaboration with KSU is also being introgessed. It seems to have less effect on agronomic performance, but also may not be as effective in Nebraska as *Wsm1*. A number of lines that may have this source of resistance were given to Dr. Gary Hein, entomologist, who is testing them in the field. The frequency of lines carrying virus resistance remains far lower than expected. There appears to be a genetic segregation distortion in heterozygous plants with the progeny often not carrying the gene or that the lines are lost during selection for better agronomic types. However, we continue make numerous crosses as this is a key trait for Nebraska. The field assay is by far the best method to determine the tolerance to this virus. With the continued spreading of wheat soilborne mosaic virus into our Lincoln fields (a key early generation testing site), we are now able to select for wheat soilborne mosaic virus resistant lines and many of lines have this beneficial trait.

11. **Understanding the Stem Rust Resistance in 'Gage' Wheat:** T. Kumssa, P.S. Baenziger, S. Wegulo, M. Rouse, and Y. Jin.

Wheat (*Triticum spp.*) stem rust, caused by *Puccinia graminis* f. sp. *tritici* Eriks. & E. Henn. (*Pgt*), re-emerged as a devastating disease of wheat because of virulent race Ug99 (TTKSK). Many bread wheat (*T. aestivum* L.) cultivars grown in North America are susceptible to Ug99 or its derivative races that carry additional virulence. 'Gage' was released in 1963 mainly for its excellent field resistance to leaf rust (caused by *Puccinia triticina* Eriks) and stem rust. However, Gage's resistance has not been genetically characterized, which would facilitate its use in breeding programs. To better define the nature of the resistance in Gage, we created an F_2 population and the corresponding $F_{2:3}$ and $F_{4:5}$ families from crosses between Gage and stem rust susceptible cultivar 'Bill Brown.' Inheritance of resistance to *Pgt* race QFCSC and molecular marker analysis indicated that *Sr2* and additional genes explain the stem rust resistance of Gage. Using seedling plant infection types from the F_2, $F_{2:3}$ and $F_{4:5}$ families, we found that at least one dominant and most likely one recessive gene are involved in Gage's resistance. Seedling resistance genes acted independently of *Sr2* since *it* is effective only at the adult plant stage. To further study this resistance, we created a recombinant inbred-line population, which is being tested at St. Paul, MN, increased at Ithaca, NE. Many lines are being tested next year in Kenya where the global Ug99 testing is being done.

12. Association Mapping for Important Biotic & Abiotic Related Traits in a Structured Wheat Breeding Population: I. Salah, J. Poland, K. Eskridge, A. Lorenz, and P.S. Baenziger

This research focuses on applying genomic selection methods in our breeding program using different statistical approaches to build new applicable protocols that will be used to improve our selection. We are specifically interested in effectively building the genotype by environment interaction (GxE) into our models because we occasionally have years like 2012 (the earliest in the last 29 years) which are very unrepresentative for phenotypic selection and our main early generation selection nurseries are in eastern Nebraska while most of our wheat is grown in western Nebraska. We also hope to build over-year models to ranks lines that are developed in different years to see how they are predicted to perform in the future. However, we are constantly adding new germplasm into our breeding program and it is presumed that with this new germplasm we can also bringing in new alleles not seen in previous years. As such we will need

to blend current year genotyping and phenotyping with our over-year genotyping and phenotyping so as not to bias our selection only toward those alleles that we have previously used in our breeding program. In 2015 we have expanded our genotyping from the duplicate (preliminary yield trial, ~ 273 lines) to the preliminary observation nursery (~2000 lines).

13. Fusarium Headblight (FHB) Research: S. Wegulo, G. Bai, P. S. Baenziger

In previous research, we found *Fhb1*, a major gene for scab (syn. Fusaium head blight) tolerance, was not pleiotropic or linked to genes that reduce grain yield. We are using high yielding *Fhb1* lines from segregating populations and Wesley *Fhb1* study in our crossing block. For the first time, we are seeing lines in our multiple-location observation nursery that contain *Fhb1*, indicating our breeding strategy is beginning to work. In addition, Dr. Guihua Bai has created a number of Overland backcross *Fhb1* lines, which are also extensively being used in the greenhouse-crossing block. Overland has a native tolerance which with the added tolerance conveyed by Fhb1 could be extremely valuable in creating new cultivars with tolerance to scab. Of course, Overland has been a very popular and high yielding cultivar in Nebraska, which makes its use as a parent very attractive. Finally, Guihua has made a number of NE06607 *Fhb1* lines, which may have value in our organic breeding research, as NE06607 has the right combination of disease resistance, agronomic performance, and end-use quality attributes.

14. Breeding for Organic Systems: R. Little, P. S. Baenziger, T. Regassa

In 2013 and 2014, the Organic State Winter Wheat Variety yield trials (SVT) at Clay Center were planted after alfalfa rather than after soybeans as in previous years. Planting after alfalfa enabled timely planting on September 24 in 2014 and October 3 in 2013 compared to as late as October 31 in previous years and contributed to yields several bushels higher than in conventional trials in 2014. The small overlap in number of lines being tested in conventional and organic environments is a testament to differential criteria and performance. See the following table and http://cropwatch.unl.edu/web/varietytest/wheat. The high LSD indicates that the top 17 lines were not significantly different than the top-yielding line. Three new experimental lines, NE10507, NE11499, and NE12589 yielded in the top five.

The second and final year was completed for testing 12 cultivars and experimental lines in environments after either soybeans or alfalfa in a "Nitrogen-Use-Efficiency-for-Quality" experiment. Baking of white bread and reconstituted whole wheat bread is in process for each of these lines at 2- or 3-protein content levels. The samples are composites of wheat from both alfalfa and soybean environments. Samples from the soybean environment were cleaned on a Carter Density Separator to remove bunt spore balls. Cold soils from this environment, planted five weeks after the alfalfa environment, were conducive to spore germination. Soil samples were collected from each plot in early spring and in July of 2014. Soil nitrogen, nitrate, and ammonium changes will be compared to the amount of nitrogen in the harvested grain to determine whether low-protein lines that bake well use as much nitrogen as the high-protein lines. Karl 92 and Lyman are the benchmark high protein lines on different ends of the yield spectrum.

Cultivar	SVT14 CC Organic Grain Yield (bu/acre)	SVT14 CC Conventional Grain Yield (bu/acre)	SVTCC Organic Grain Protein Content (%)
Expedition	72		14.2
NE10507	72		13.0
NW03666 (W)	71		13.7
NE11499	71		14.9
NE12589	70		13.6
NE09521	70		13.6
Lyman	68		14.7
Goodstreak	68		14.4
Camelot	68	58	14.0
Overland	67	63	13.9
NW03681 (W)	67		14.3
SD07165	67		13.1
NE06469	67		13.7
Freeman	66	57	13.6
NW07505 (W)	66	60	13.4
NE07409	65		13.1
NE06607	65		14.0
McGill	64	54	13.3
NE08659	63		13.3
NE12662	63		13.8
Arapahoe	62		14.0
NE07444	62		14.2
NIO8708	62		13.9
Wahoo	60		13.2
Karl 92	57		15.3
NE12524	56		14.8
Pronghorn	56		14.2
NE08457	54		14.4
NE02558	54		13.7
Turkey	52	43	14.5
NW09627	50		13.6
Scout 66	47	38	14.3
Mean	63	54	13.9
LSD.05	7	6	0.3

15. Variation for Grain Mineral Concentration in a Diversity Panel of Current and Historical Great Plains Hard Winter Wheat Germplasm: M. Guttieri, P.S. Baenziger, K. Frels, B. Carver, B. Arnall, and B. Waters**.**

Wheat grain mineral concentrations tend to decrease as yields increase, therefore breeding for yield improvement may have reduced wheat nutritional quality. The study objective was to survey grain mineral concentration in Great Plains hard winter wheat to assess:

1) the heritable variation for grain mineral concentrations in the germplasm pool;
2) the effects of more than 50 years of wheat breeding on mineral concentrations; and
3) opportunities to exploit the underlying physiological relationship between grain protein concentration (GPC) and grain mineral concentration to improve nutritional quality.

Grain mineral concentrations were measured in a panel of 299 winter wheat genotypes grown in 2012 and 2013 in Oklahoma and Nebraska. Cadmium and Li concentrations were most heritable across environments, and the low heritabilities of Fe and Zn concentrations will challenge direct breeding efforts, particularly within low-yield environments that minimize genetic variance. Within the subset of cultivars released from 1960 to 2014, grain yield increased 0.58 to 1.25 % yr^{-1}, and Zn concentration decreased 0.15 to 0.26% per year, relative to the reference cultivar, 'Scout 66.' Grain concentrations of Fe, P, and S also trended lower over this time. Significant genetic variation persists within contemporary germplasm: among 93 cultivars released since 2000, Zn concentration max:min ratios ranged from 1.5 – 2.3, depending on environment. The positive interrelationship between GPC and grain Fe and Zn concentrations could be exploited in a yield-neutral breeding strategy that selects genotypes based on positive grain protein deviation in multiple environments.

16. Prospects for Selecting Wheat with Increased Zinc and Decreased Cadmium Concentration in Grain: M. Guttieri, P.S. Baenziger, K. Frels, B. Carver, B. Arnall, S. Wang, E. Akhunov, and B. Waters

Wheat (Triticum aestivum L.) is a primary staple cereal and a significant source of mineral nutrients in human diets. Therefore, increasing concentration of the essential mineral, zinc (Zn), and decreasing concentration of the toxic mineral, cadmium (Cd), could significantly improve human health. Because plant mechanisms for uptake and translocation of Cd and Zn are related, we assessed both Cd and Zn concentration to evaluate their independence in hard winter wheat germplasm. Grain Cd concentration of some genotypes grown in Nebraska trials were above the Cd Codex guidance level (> 0.2 mg kg-1), and highly repeatable differences in grain Cd were found between pairs of low and moderate-Cd commercial cultivars. Grain Cd concentration was predicted by Cd concentration in aboveground plant tissues at anthesis. However, grain Zn concentration was not predicted by Zn concentration in above-ground plant tissues. Genome-wide association scans using high density SNP markers identified markers on 5AL associated with grain Cd in a region homoeologous to the Cdu1 locus on 5BL in durum wheat (Triticum turgidum L. var. durum Desf.). Genetic regulation of grain Cd concentration in bread wheat may be more complex than in durum wheat because epistatic interactions between SNP markers were identified, and not all variation was explained by SNP marker haplotypes. SNP marker associations with Zn concentration were weak and inconsistent across trials, and Zn concentration was independent of 5AL SNP markers. The independent genetic regulation of grain Cd and Zn concentrations indicates that breeding low Cd hard winter wheat genotypes without reducing Zn concentration has high potential for success.

17. Choosing the Best Vegetation Index for Use in Nitrogen Use Efficiency Selection in Winter Wheat: K. Frels, M. Guttieri, P.S. Baenziger

Nitrogen use efficient (NUE) crops are needed to reduce increasing nitrogen costs and environmental concerns. However selecting for NUE wheat is difficult due to the labor intensive and destructive nature of traditional phenotyping methods. Canopy spectral reflectance (CSR) is non-destructive, quick, and less labor intensive phenotyping method that measures incident light reflected by the plant canopy. Reflectance values for specific wavelengths are selected and used to calculate vegetation indices such as Enhanced Vegetation Index (EVI). These vegetation indices can be used to estimate specific traits related to nitrogen use efficiency such as biomass, canopy N content at flowering, and yield. During the 2012 and 2013

growing seasons, a 299-genotype hard winter wheat-association mapping panel grown near Ithaca, NE was phenotyped weekly from anthesis to physiological maturity using CSR. Biomass samples were harvested at anthesis and physiological maturity. Protein concentration in vegetative tissues and grain was measured using a Perten DA7200 diode array NIR (Hägersten, Sweden). Grain N yield was calculated as (grain yield x grain protein content x 0.01)/5.7. Several vegetation indices were calculated from this data set. The plant productivity traits such as anthesis biomass, grain yield, and grain N yield were compared with the vegetation indices. In 2012, a year with a yield-limiting environment, EVI (Enhanced Vegetation Index) was highly heritable and showed high correlation with all plant productivity traits. In 2013, an optimal yield year, all VI had high heritability but were less sensitive to genotype differences. Alternative VI or analysis methods will be needed for optimal years.

18. Breeding for Nitrogen Use Efficiency in Hard Winter Wheat Using Canopy Spectral Reflectance and Genomic Selection: K. Frels, M. Guttieri, P.S. Baenziger

Nitrogen use efficient (NUE) crops are needed to reduce increasing nitrogen costs and environmental concerns. However, traditional phenotyping methods for NUE are labor intensive and destructive. Canopy spectral reflectance (CSR) is non-destructive, quick, and less labor-intensive phenotyping method that measures incident light reflected by the plant canopy. Reflectance values for specific wavelengths are selected and used to calculate vegetation indices that estimate traits such as chlorophyll content and biomass. During the 2012 and 2013 growing season, the USDA-NIFA Triticeae Coordinated Agricultural Project (TCAP) supported proximally-based CSR phenotyping in the 299-genotype hard winter wheat association mapping panel grown near Ithaca, NE. CSR data was collected weekly from anthesis to physiological maturity using a dual-fiber optic system allows for adjustment to incident light. Entry mean heritability of vegetation indices was calculated, and the most heritable indices were used in a G-BLUP genomic selection model using SNP markers. Prediction accuracy was estimated using 10 fold cross validation replicated 100 times. In 2012, accuracy for EVI phenotypes ranged from 0.38 for week 1 EVI to 0.57 for week five EVI showing that genomic selection combined with CSR data was successful in predicting unphenotyped lines within same year. Analysis for 2013 and testing the prediction accuracy of genomic selection and CSR data across years/environments is ongoing.

19. Hybrid Wheat: N. Garst, A. Easterly, P.S. Baenziger, A. Ibrahim

The interest in hybrid wheat has been in the literature for the better part of the 20th century, and work has been undertaken by various seed companies. A number of challenges have limited its success. The constraints of budgeting, logistics and biological limitations of hybridization in an autogamous species, and the time investment in feasibility projects ultimately led to the end of programs. It has been argued that hybrid wheat may not be a feasible undertaking as the crop lacks the mechanical advantages to seed production and predisposition to cross-pollination, a phenomenon that has made hybrid maize a profitable endeavor. Research has begun to evaluate Nebraska breeding lines for better male parent characteristics to improve the amount of pollen available for cross-pollination. In wheat, recent estimates of yield increase of hybrids over elite parents has been estimated to be at 10.7%. Likewise, increased resistance to pathogens and pests has been noted. As such, the goal of this research is to evaluate the extent to which yields of wheat could be increased in hybrids, to develop commercially successful varieties for farmers in the Great Plains.

Three systems by which to produce hybrid seed have been proposed in the literature. The first is through use of cytoplasmic male sterility (CMS) in a similar manner as the A-, B-, and R-Line system used in generation of hybrid sorghum. Wheat lines with a *Triticum timopheevi* Zhuk. cytoplasm are often used

for the A-line and produce stable cytoplasmic male sterility. CMS presents a challenge, however, in that A- and B-lines must be developed and maintained prior to any large-scale production of hybrid seed. The second method of seed production is through use of thermo- or photoperiod-sensitivity genetic male sterility, a process that comes with a number of considerations for the logistics of managing and maintaining seed quality. The third involves the chemical emasculation of female parents through use of chemical hybridization agents (CHAs) — also referred to as gametocides. Commercial production of these chemicals has been in place for a number of years. The use of CHAs has limitations in that the window of application is small and requires careful calibration and application for highest efficacy, but provides a simple approach and is conducive for large-scale production of hybrid seed.

In order for hybrid wheat to be commercially successful, a number of characteristics must be considered. First, we must find effective hybridization system on a large scale. For this, the small grains program at UNL will be developing and examining potential hybrids developed through use of CHAs, then evaluating the potential for a CMS system to produce commercial hybrids. Crossing blocks were planted in the fall of 2014 for treatment with CHA in 2015 to develop a set of experimental hybrids. Hybrid seed comes at an annual cost to farmers, who are able to obtain seed at low cost from local co-ops or public breeding programs. The performance of a hybrid must well exceed that of any current commercial cultivars in either yield, vigor, disease- and pest-resistance, the ability to seed at a reduced rate, or any combination thereof to be worth the added cost. With this in mind, evaluation must be made to precisely determine the amount of heterosis exhibited for yield and other key traits in hybrid wheat such that the increase in productivity justifies the cost for both producers and researchers. This will be examined in our experimental population of hybrids in the 2015/2016 and 2016/2017 growing seasons. Greenhouse work to identify R-lines is underway in conjunction with the introgression of male sterile cytoplasm into Nebraska-adapted winter wheat lines. Most current wheat breeding is done for the development of inbred cultivars, and as such, no true heterotic pools have been identified. Through utilization of modern genomic systems, we will work to build reliable and high-performing heterotic pools for hard winter wheat.

Another major pitfall for the success of hybrid wheat has been the cost of producing hybrid seed. Due to the cleistogamous nature of wheat, the amount of pollen available to pollinate male sterile (female parents) is low. The lack of pollen requires hybrid production fields to be planted with more male parents to get proper cross-pollination. Production costs increase because the product (F1 seed) is planted on less area. Research is being conducted on improving certain characteristics, which would increase the amount of available pollen. The first of these characteristics is anther extrusion, which is the ability of the wheat anthers to break out of the spikelets. Initial ratings for anther extrusion were done during the 2013/2014 growing season with some success. Research in the 2014/2015 growing season will focus on better calibrating the metric and rating the parents in the crossing block. Lines which have the highest ratings for anther extrusion will then be evaluated for amount of pollen shed, pollen flow (distance traveled), and pollen viability during the 2015/2016 growing season. The goal is to validate the selections and look for correlations between floral traits.

20. Enhancing wheat (*Triticum aestivum* L.) drought tolerance using SNP markers based on high throughput genotyping by sequencing technology: W. Hussain, P.S. Baenziger, M.Guttieri)

Drought globally is the most wide spread limitation to wheat productivity and stability in rainfed systems. The Great Plains wheat belt has been battling drought for years. Consequently developing wheat cultivars with enhanced drought tolerance and high yield has been the focus of many wheat improvement programs. Improving drought tolerance is challenging due to its complex nature and previous studies conducted in identifying key genes/quantitative trait loci (QTL) were based mostly on low-density markers and not able to provide precise information about the numbers and locations of QTLs controlling the traits related to drought. This present study will grow lines across a diverse range of environments (Lincoln,

Mead, Grant, Sidney, Alliance and North Platte) where different levels of drought naturally occur with following objectives:

1) Screening recombinant inbred lines (RILs) and their parents (Harry and Wesely) for grain yield components and several morpho-physiological traits in response to drought;
2) Developing high-density SNP markers for better marker trait association using genotyping by sequencing approach;
3) Assessing the stability of the various morpho-physiological traits and investigating the occurrence of genotype x environment interaction; and
4) Identification of QTLs and QTL x environment effects for several morpho-physiological traits. The ongoing research will facilitate fine mapping of selected trait genes in response to drought, providing a foundation enabling the development of superior wheat varieties.

21. Combining ability for tolerance to pre-harvest sprouting in wheat: J. Fakthongphan, R. Graybosch and P.S. Baenziger

Pre-harvest sprouting (PHS) can have a significant impact on wheat (*Triticum aestivum* L.) production, yield, and end-use product quality, leading to massive economic losses. Red wheats are normally more resistant to PHS than white wheats. The objective of this study was to identify red wheats capable of donating genes for PHS tolerance in white wheats, independent of red seed color. A factorial (M × N) mating was conducted using eight red wheats: 'Niobrara,' 'Wesley,' 'Arapahoe,' NE98466, CO960293-2, 'Jagalene' NI01812 and 'Plainsman V' and six white wheats: 'Nuplains,' NW99L7068, 'RioBlanco,' 'Cayuga,' NW97S218, and 'Peck.' General combining ability (GCA) for individual parents and specific combining ability (SCA) for specific crosses were used to identify effective donor red wheat parents. GCA and SCA were calculated from a pre-harvest tolerance score (Delta Value) determined after testing head selections in a misting chamber, and from Falling Number measurements of field-grown materials. GCA amongst red parents (GCAr) was significant for both Delta Value and Falling Number, but not in white parents (GCAw). GCA or SCA by environmental interactions, with the exception of the Delta Value from GCAr, were significant. Jagalene and Niobrara were identified as potential red wheat genetic reservoirs for additional genes of PHS tolerance. A significant correlation of SCA of Falling Number and SCA of Delta Value was detected ($r = 0.38$, $n = 48$, $P = 0.007$). Falling Number assay can be replaced by Delta Value assay for evaluating PHS tolerance in wheat breeding programs in areas in which pre-harvest sprouting is not routinely observed.

IV. GREENHOUSE RESEARCH

In 2012, the majority of F_1 wheat populations were grown at Yuma, AZ. Mainly populations needing additional crosses are being grown in the Lincoln Greenhouses. This change reduced our greenhouse space and greenhouse labor, and provided much greater quantities of F_2 seed. We made more than 100 triticale, 100 barley and 1000 wheat crosses in last year's fall, winter, and spring greenhouses.

V. PROPRIETARY RESEARCH

Public Private (University of Nebraska) Collaborations:

In 2009, the University of Nebraska decided to sustain the whea-breeding project via enhanced collaborations with commercial companies spanning the value chain. The University of Nebraska-Lincoln (UNL) has had a long-standing arrangement with BASF, providing access to the Clearfield technology. Infinity CL and Settler CL are outcomes of this research. We are now concentrating on two-gene herbicide tolerant wheat cultivars. In 2009, UNL began collaboration with ConAgra (now part of Ardent Mills).

They support our McCook Nursery and provide valuable information on the end-use quality of our lines at that site, which is a key sourcing site for their Colorado mills. In 2010, UNL developed a collaboration with Bayer Crop Science that allows non-exclusive access to UNL germplasm and is in accordance with the principles for collaboration approved by the National Association of Wheat Growers and with the U.S. Wheat Associates Joint Biotechnology Committee. This collaboration has led to extensive collaborations and interactions on genetics, plant breeding, and crop physiology. Having their excellent staff in Lincoln has been very advantageous to student and staff interactions. In 2012, we evaluated more than 900 doubled-haploid lines created in collaboration with Limagrain and are evaluating lines in replicated trials at numerous locations. We continue to develop germplasm exchange agreement with private companies as their germplasm is becoming increasingly relevant. Our goal continues to be the "People's University" and to work will all public and private wheat researchers in a manner compatible with the landgrant mission.

USDA-ARS projects at the University of Nebraska are not party to these agreements.

We received our 11th year of research and development fees from an agreement with Paramount Seed Farms (a commercial seed company) for the exclusive release of our winter barley germplasm. We are fortunate that they took the initial risk of building a market for our germplasm when no one else was interested. No new barley lines were released in 2014, but P-845 (released in 2013) had a good year.

We had extensive winterkilling on barley in eastern Nebraska. At Lincoln, it was mainly due to blowing (the plants were destroyed by wind and blowing soil). At Mead, the winterkilling was mainly due to low temperatures. Of the two locations, the data from Mead is more valuable as winter survival under low temperatures is the more common occurrence. We were able to harvest yield trials at Colby, KS (good yields despite drought) and Sidney, NE (lower yields due to poorer stand establishment caused by heavy rains after planting). We were able to harvest sufficient seed from Lincoln to advance our breeding program. We have made substantial progress in working with local brewers (which are expanding), supported growers to plant their first commercial spring malting barley field (with great advice from Drs. R. Horsley, K. Smith, and J. Wiersma) for local beer production and hope to have local craft maltsters/distillers in Nebraska in the future.

Though the winterkilling was severe in eastern Nebraska where our main breeding nurseries are, we were able to salvage the breeding program. In fall, 2014, we planted a new set of F2s and the surviving F3 populations. Our headrow nursery was reduced by about 30%, but we expect the lines to be very winterhardy. The remaining nurseries have their normal size.

Figure 1. Winter survival of winter barley at Mead Nebraska. As seen above, the winterkilling was most severe in the winter barley block followed by the winter triticale block. Except in segregating bulk populations with spring wheat parents, there was no winterkill among the wheat lines. Where virtually all of the winter barley was killed (a Barley CAP trial and the winter malting barley trial), the surviving plots were winter wheat check plots. The barley that survived the winter was the Nebraska intermediate and elite trial and the F_3 populations, which previously survived the winter of 2013 as F_2 populations

With the current level of private sector investments in research, additional public-private interactions are to be expected and we are developing relationships with many other organizations. A key goal will be to develop working relationships that benefit the producer, the customer, and the public good.

The 2014 barley data are:

Name	Lincoln Winter Survival	Mead Winter Survival	Colby, KS Heading Date	Colby, KS Yield	Sidney,NE Yield	Average Yield	Rank	Colby, KS Moisture	Colby, KS Test Wt	Average Height
	%	%	Julian	lbs/a	lbs/a	lbs/a		%	lbs/bu	in
P-713	19.3	68.0	141.9	2978	2041	2510	18	10.8	44.8	26.9
P-721	5.9	84.1	142.1	2872	1918	2395	23	10.1	45.9	26.2
P-954	10.9	83.3	142.9	3186	2488	2837	6	10.8	47.6	26.0
TAMBAR 501	3.3	71.4	140.2	2651	1322	1987	34	10.2	41.4	25.6
NB09437	11.5	74.7	142.6	2565	908	1737	37	11.4	47.9	27.6
NB09441	0.0	67.7	137.7	2500	879	1690	38	10.0	41.4	25.9
NB10403	11.7	79.2	137.8	2028	2763	2396	22	11.5	45.8	27.8
NB10409	8.1	74.3	143.0	2931	1507	2219	29	11.1	51.2	28.1
NB10417	0.0	80.7	139.1	2845	1986	2416	21	10.3	43.7	25.0
NB10420	2.7	40.1	139.9	2413	1719	2066	31	10.6	46.9	26.2
NB10425	2.8	67.3	141.8	3077	1555	2316	27	10.2	44.7	27.4
NB10440	2.7	71.3	139.7	2598	1543	2071	30	11.4	46.5	27.7
NB10444	0.0	64.7	140.2	2596	3157	2877	3	11.2	45.3	26.1
P-845	2.7	79.9	141.1	3084	2530	2807	7	10.8	46.9	24.5
NB11414	0.0	40.9	142.3	2841	2953	2897	2	10.7	46.0	26.0
NB11416	11.0	65.6	141.5	3212	2107	2660	12	10.6	43.7	27.5
NB11418	9.3	71.5	141.7	2885	2489	2687	10	10.5	46.0	24.8
NB11430	0.0	75.4	139.9	2925	2124	2525	17	10.9	47.9	28.0
NB12419	16.6	82.6	142.4	3153	1853	2503	19	11.0	45.4	27.1
NB12421	53.4	83.5	142.8	3423	2261	2842	5	12.0	44.8	25.9
NB12422	3.4	79.1	142.7	3359	1168	2264	28	10.4	47.8	26.1
NB12424	0.1	72.6	143.0	3181	1524	2353	25	11.0	47.4	25.3
NB12425	21.7	83.4	142.6	3336	2689	3013	1	10.8	45.4	25.7
NB12426	2.7	81.4	142.4	3249	1920	2585	15	11.2	47.3	28.2
NB12431	2.8	74.3	140.7	3266	2430	2848	4	11.1	46.5	24.4
NB12433	-0.1	52.7	141.2	3149	1929	2539	16	11.2	47.7	23.7
NB12434	18.3	76.1	140.2	3152	2360	2756	8	10.2	44.5	24.9
NB12436	5.9	65.1	140.7	3055	1646	2351	26	10.9	46.0	27.4
NB12437	21.6	73.6	141.7	3122	1637	2380	24	10.3	45.8	26.7
NB13401	0.0	82.7	142.1	3056	2266	2661	11	10.4	45.2	27.2
NB13415	9.4	61.0	141.3	2661	2532	2597	14	10.7	45.9	27.4
NB13430	0.1	51.3	141.1	2905	1965	2435	20	10.8	42.3	26.2
NB13434	0.0	30.5	144.2	2333	1641	1987	33	10.9	44.8	27.1
NB13435	0.0	46.3	143.0	2649	2624	2637	13	11.5	47.4	26.1
NB13436	0.0	38.1	143.0	2888	2617	2753	9	11.2	47.7	24.4
NB13437	0.1	21.6	142.1	2346	954	1650	39	11.0	43.0	24.9
NB13438	0.1	28.3	142.1	2509	1433	1971	35	10.9	44.5	23.3
NB13440	0.0	13.4	144.1	2295	572	1434	40	10.9	45.6	23.1
NB13441	0.0	45.3	138.4	2702	1048	1875	36	11.2	45.9	22.2
NB13442	0.0	33.2	143.5	2611	1519	2065	32	12.4	43.9	24.5
GRAND MEAN	**6.4**	**63.4**	**141.5**	**2865**	**1914**	**2390**		**10.9**	**45.7**	**26.0**
LSD	**6.8**	**19.2**	**2.1**	**633**	**1505**			**1.6**	**6.6**	
CV	**99.4**	**28.6**	**0.8**	**11**	**48**			**7.6**	**7.3**	

Of the released cultivars (Table 1), P-954 did very well as expected, because it is one of the most winter-hardy lines developed at UNL. P-845 (released last year) also did very well. One of the surprises was that TAM BAR 501 (developed in Texas and which normally has acceptable winter-hardiness) did poorer than normal in Colby, KS and Sidney, NE.

The 2013 barley data are:

	Colby			Lincoln				Mead					
	Plant Height	Grain Yield	Test Weight	Heading Date	Plant Height	Lodging (rate)	Grain Yield	Heading Date	Plant Height	Lodging (rate)	Grain Yield	Mean Yield	
Name	Inch	lbs/a	lbs/bu	After April 1	Inch	0-9	lbs/a	After April 1	Inch	0-9	lbs/a	lbs/a	Rank
NB12437	22	1505	45	19	33	0	5212	22	31	2	5664	**4127**	**1**
NB11430	23	1700	45	18	34	0	5369	20	31	1	5242	**4104**	**2**
NB10425	21	1946	47	19	33	0	5329	24	33	1	4993	**4089**	**3**
P-845 (NB99845)	18	1670	45	19	31	0	5247	23	30	0	5240	**4052**	**4**
NB09404	21	1720	46	18	35	0	5084	20	33	0	5242	**4015**	**5**
NB12424	18	1576	45	19	31	0	5144	23	32	0	5278	**3999**	**6**
NB12419	20	1890	48	20	31	0	4784	23	32	0	5237	**3970**	**7**
NB12434	20	1551	47	17	31	0	5155	21	30	2	5082	**3929**	**8**
NB09409	19	1782	47	19	32	0	5057	23	33	2	4942	**3927**	**9**
NB09410	21	1665	50	19	36	0	4968	22	33	0	5047	**3893**	**10**
NB10444	20	1724	49	18	29	0	4946	21	30	2	4973	**3881**	**11**
NB12431	18	1266	45	18	30	0	5485	22	30	1	4795	**3849**	**12**
NB12426	20	1609	43	19	34	0	4822	24	33	2	5062	**3831**	**13**
TAMBAR 501	19	1518	39	18	31	0	5328	20	31	1	4646	**3831**	**14**
NB12421	19	1661	45	20	30	0	4938	24	30	2	4892	**3830**	**15**
NB10417	19	1621	44	18	32	0	5429	19	30	2	4304	**3785**	**16**
NB09437	21	1463	47	19	36	0	5246	22	31	1	4550	**3753**	**17**
NB11416	20	1585	42	19	33	0	4990	22	30	4	4670	**3748**	**18**
NB10403	23	1251	43	15	34	0	5216	18	33	1	4774	**3747**	**19**
NB12425	20	1746	47	20	31	0	4709	23	33	3	4762	**3739**	**20**
NB11414	19	1859	42	18	32	0	4804	25	32	0	4456	**3706**	**21**
NB09425	18	1453	44	19	29	0	4789	23	28	1	4838	**3693**	**22**
NB10420	21	1434	36	15	35	0	5027	19	33	0	4584	**3682**	**23**
P-713	20	1638	49	19	34	0	4567	22	35	3	4724	**3643**	**24**
P-954	17	1472	38	19	31	0	4602	23	31	4	4831	**3635**	**25**
NB12422	19	1732	46	19	31	0	4307	22	31	2	4794	**3611**	**26**
NB12436	21	1713	44	20	34	2	4451	22	33	2	4622	**3595**	**27**
NB10440	21	1577	52	17	32	0	4772	21	33	1	4388	**3579**	**28**
NB12433	19	1137	33	18	31	0	4609	21	33	0	4907	**3551**	**29**
NB12408	17	1412	37	19	31	0	5041	22	26	0	4129	**3527**	**30**
NB09441	20	1063	31	18	34	0	5083	21	30	0	4420	**3522**	**31**
NB08428	22	1516	37	19	31	0	4687	23	30	2	4335	**3513**	**32**
NB11418	17	1481	37	19	30	0	4904	22	29	1	4128	**3504**	**33**
NB12440	19	1295	38	19	34	0	4544	27	32	0	4637	**3492**	**34**
NB11438	21	1360	42	18	32	0	4215	21	32	0	4857	**3477**	**35**
NB12417	17	1826	47	23	28	0	3899	27	28	2	4687	**3471**	**36**
NB12418	19	1165	45	17	31	0	4932	19	32	1	4169	**3422**	**37**
NB10409	19	1546	35	18	35	1	4124	20	32	1	4581	**3417**	**38**
P-721	19	1487	53	19	31	2	3494	22	29	3	4492	**3158**	**39**
NB12403	24	687	32	18	32	0	4240	22	33	0	4055	**2994**	**40**
Mean	**20**	**1532**	**43**	**19**	**32**	**0**	**4839**	**22**	**31**	**1**	**4751**	3707	
CV %	**7**	**17**	**22**	**1**	**4**	**252**	**7**	**1**	**5**	**126**	**9**		
LSD 5%	**2**	**368**	**13**	**1**	**2**	**1**	**516**	**2**	**3**	**3**	**673**		

The 2012 barley data are:

Winter Barley Variety Trial (BVT) 2012 Summary for Lincoln and Mead, NE

VARIETY	Lincoln				MEAD				Across Locations	
	Anthesis	PHT	YLD	Rank*	Anthesis	PHT	YLD	Rank	YLD	Rank
	(after April1)	*Inch*	*lbs/a*		*(after April1)*	*Inch*	*lbs/a*		*Lbs/a*	
P-713	19	35	4784	15	24	35	5563	3	5173	7
P-721	21	31	3908	36	26	32	4786	25	4347	33
P-954	23	32	3218	39	25	32	4564	33	3891	39
TAMBAR 501	16	34	4772	17	21	35	5375	9	5073	11
NB08428	20	33	4332	27	23	34	5385	8	4859	18
NB09404	20	34	4732	18	24	36	5493	5	5113	9
NB09405	16	32	3668	38	22	35	4570	32	4119	36
NB09409	20	32	4608	21	25	35	5254	11	4931	15
NB09410	19	35	5216	5	23	37	5842	2	5529	2
NB09425	19	30	4811	14	25	32	5200	13	5006	13
NB09427	24	32	4185	30	27	35	5253	12	4719	24
NB09430	14	33	4064	32	21	37	4888	21	4476	28
NB09432	22	33	4083	31	26	35	4236	39	4160	35
NB09433	21	32	4242	29	26	34	4627	28	4434	31
NB09434	20	33	4295	28	25	32	4833	24	4564	25
NB09437	20	36	5321	3	24	36	6064	1	5692	1
NB09439	20	32	4636	19	24	33	4886	23	4761	21
NB09440	13	33	3935	34	21	35	4285	37	4110	37
NB09441	18	34	4903	12	21	36	5017	17	4960	14
NB10403	13	34	4951	9	21	38	4740	27	4846	19
NB10404	14	34	4556	22	21	35	4241	38	4399	32
NB10409	15	37	5023	8	22	38	4760	26	4892	16
NB10417	15	31	5077	6	21	35	5177	14	5127	8
NB10420	14	33	4774	16	21	36	5000	18	4887	17
NB10421	18	34	4934	11	24	35	4508	34	4721	23
NB10425	20	37	4951	9	25	35	5075	15	5013	12
NB10440	15	33	4891	13	22	35	5265	10	5078	10
NB10444	16	31	5536	1	21	35	5435	6	5486	3
NB11404	16	34	2848	40	21	35	3200	40	3024	40
NB11405	19	35	4516	23	25	37	4589	29	4552	26
NB11414	19	32	5488	2	23	35	4887	22	5188	6
NB11416	20	34	5035	7	24	35	5543	4	5289	5
NB11418	16	32	4611	20	22	33	4952	20	4782	20
NB11419	19	32	4335	26	22	34	4583	30	4459	29
NB11427	18	31	4033	33	22	33	4983	19	4508	27
NB11429	21	34	3782	37	23	33	4425	36	4104	38
NB11430	17	35	5219	4	21	36	5423	7	5321	4
NB11431	20	31	3911	35	25	31	4582	31	4247	34

NB11432	19	33	4398	25	24	34	4489	35	4443	30
NB11438	17	33	4459	24	22	35	5050	16	4755	22
Mean	**18.18**	**33.22**	**4526.1**		**23.10**	**34.68**	**4925.7**			
Coeff Var	**1.05**	**1.38**	**7.57**		**4.52**	**3.02**	**8.44**			
Root MSE	**1.47**	**1.38**	**342.45**		**1.05**	**1.05**	**415.61**			
R-Square	**0.91**	**0.68**	**0.81**		**0.81**	**0.78**	**0.70**			
LSD (p=0.05)	**1.71**	**2.37**	**556.66**		**1.69**	**1.70**	**675.58**			
P-value	**<0.0001**	**<0.0001**	**<0.0001**		**<0.0001**	**<0.0001**	**<0.0001**			

VI. ALLIED RESEARCH

The wheat breeding or variety development project is only one phase of wheat improvement research at the University of Nebraska-Lincoln. The project interacts and depends on research in wheat germplasm development, wheat quality, wheat nutritional improvement, wheat cytogenetics, plant physiology and production practices, and variety testing. Much of the production research is located at the research and extension centers. All components are important in maintaining a competitive and improving wheat industry in Nebraska. The allied research is particularly necessary as grain classification and quality standards change and as growers try to reduce their production costs.

The program also depends on interactions and collaborations with the Wheat Board, Nebraska Wheat Growers Association, regional advisory boards, Foundation Seeds Division, Nebraska Crop Improvement Association, the milling and baking industry, the malting and brewing industry, and other interested groups and individuals. The Nebraska Seed Quality Laboratory cooperates closely with the Wheat Quality Council to bake the large-scale cooperator samples. Ardent Mills also provides excellent milling and large-loaf baking data to support our small-loaf testing procedures. Numerous groups have visited the laboratory and participated in discussions on quality and marketing. Through these interactions, the program is able to remain focused and dedicated to being a premier provider of quality varieties, information, and technologies to help maintain the Nebraska Wheat Industry. We also wish to highlight the generosity of Mr. Martin Stumpf who recently donated one section of rainfed and irrigated land for an International Wheat Research Center in Grant, NE, and the funds for a new building on the site. Grant is one of the finest wheat producing regions in Nebraska and this location will be a huge benefit to the Nebraska wheat producers. We hope our program will live up the high expectations of the donor.

VII. COMINGS AND GOINGS

All projects are more than crosses, selections, evaluations, data, and seed. At its heart, it is the people who make this research possible. Dr. Mary Guttieri completed her Ph.D. degree and continues to help the project immensely while working on a postdoc with Dr. Brian Waters. Ms. Caixia Liu and Mr. Javed Sidiqi joined the program as Ph.D. students. Dr. Hanaa Abouzeid joined the project as a Fulbright visiting scholar. We are extremely grateful for the excellent work that the team has done and continues to do.

Summary:

In 2013-2014 season, 1,550,000 acres of wheat were planted in Nebraska and 1,450,000 were harvested with an average yield of 49 bu/a for a total production of 71,050,000 bu. This production was almost 180% higher than the 2012-2013 crop, which bodes well for wheat producers. In 2012-2013 season, 1,470,000 acres of wheat were planted in Nebraska and 1,130,000 were harvested with an average yield of 35 bu/a, for a total production of 39,550,000 bu. The 2012-2013 crop was one of the smallest crops in the last 50 years and certainly highlighted the effect of drought. In 2012, 1,380,000 acres of wheat were planted in Nebraska and 1,300,000 were harvested with an average yield of 41 bu/a, for a total production of 53,300,000 bu. Despite continued genetic improvement, the main determinant in wheat production seems to be acres harvested, government programs, the price of corn, and weather (which also affects disease pressure and sprouting). This is an economic reality in understanding wheat yields and productivity in Nebraska.

Using seed sales of certified seed, the top 10 lines grown in Nebraska in 2014 were: Settler CL (15.4%), Overland (12.4%), Tam 111 (9.4%), AP502CL2 (6.3%), Winterhawk (5.6%), Wesley (5.1%), Pronghorn (5.0%), Infinity CL (4.3%), Art (3.6%), and Camelot (3.3%). In 2014, NE05548 winter wheat was formally released and will be marketed as Husker Genetics Brand Panhandle, as was NT065427 winter triticale licensed to Ehmke Seeds. The decision to release Panhandle was made in 2013 and its description may be found in the 2013 report. The description of NT06427 is in this report. NT06427 was licensed to Ehmke Seeds and is expected to be marketed under the name Short Beard Thunder. A third line (NW07505) is being tested by and considered for release to our organic producers. The importance of certified seed is recognized by our growers and the best estimate by the Nebraska Crop Improvement Association is that 78% of our planted seed is certified seed. Clearly the popularity of Clearfield® cultivars, which require planting only certified seed, help the use of certified seed. Four lines (NE07531, NE09517, NE09521, and NE10589) were advanced for possible release in 2015 or 2016. Of these, NE10589 is the most widely adapted and has the greatest potential.

Recent studies on nitrogen use efficiency (NUE) and on minerals identified Husker Genetics Brand Freeman as being particularly good for NUE, among the best lines available. As part of the NUE studies, we looked at mineral content in wheat grain. The original intent of doing mineral analyses was that we were concerned we may be misclassifying winter wheat varieties as having low NUE when in fact they were mineral deficient. We discovered that there is genetic variation for cadmium (Cd, a harmful heavy metal) in Great Plains hard red winter wheat. Interestingly, the recently released Panhandle winter wheat is a low Cd accumulation wheat. As it is a common parent in our breeding program, we will develop additional low Cd varieties in the future. Breeding environmentally sustainable small grains with better health benefits will be a major thrust of our program and for the betterment of the Wheat Industry as a whole. It will also position us well in the emerging flex crop/cover crop market where blends of crops are used to meet environmental and farm goals.

Our hybrid wheat efforts have greatly increased with the hiring of two graduate students to work on this project. While the public sector may never release a hybrid wheat variety, we are committed to developing the fundamental knowledge that will be useful in developing hybrid wheat as a commercial product in the future. Hybrid wheat is one of the most promising ways of bringing the increased productivity and technology to wheat needed to feed an ever increasing and wealthier world. Even if hybrid wheat may be years away, the knowledge on heterosis (hybrid vigor) will be extremely valuable to our conventional breeding program as it will allow us for the first time to truly look at the performance and genetics of hybrid crosses. Nor should we overlook the potential of adding numerous elite by elite populations to our conventional breeding efforts.

As part of the people's university, we continue to breed wheat suitable for all of our constituencies. Due to reduced funding, our organic wheat efforts have lessened, but we are committed to working with organic producers. We have released a new forage triticale and have numerous potential releases in the pipeline. Our barley breeding effort remains strong. Both triticale and barley are excellent alternative crops to wheat if there is a catastrophic event in wheat. For example, barley is immune to karnal bunt should it return to the Great Plains. **Our program gratefully acknowledges the generous support of the Nebraska Wheat Board.**

IMPROVING WHEAT VARIETIES FOR NEBRASKA

2014 STATE BREEDING AND QUALITY EVALUATION REPORT

Report to the

NEBRASKA WHEAT DEVELOPMENT, UTILIZATION
AND MARKETING BOARD

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March 2015

2014 STATE BREEDING AND QUALITY EVALUATION REPORT

I. INTRODUCTION

Wheat variety development research in Nebraska is a cooperative effort between the Agricultural Research Division, IANR of the University of Nebraska-Lincoln, and the Agricultural Research Service/USDA, Northern Plains Area. Winter wheat breeding, which includes variety, line, and germplasm development, is a major component of the state's wheat improvement research. This report will deal only with the state portion of the total wheat breeding effort (located in the Department of Agronomy and Horticulture at the University of Nebraska-Lincoln). Very important contributions come from state and federal researchers in the department and from Nebraska research and extension centers, as well as from state and private researchers in South Dakota, Wyoming, Kansas, Oklahoma, Texas, and Colorado. Other important contributions come from researchers in the Department of Plant Pathology (both state and federal); plant pathologists located at the USDA Cereal Disease Laboratory in St. Paul, Minnesota and USDA entomologists in Manhattan, Kansas and Stillwater, Oklahoma. All of these programs invest time and funds into this program. Grants from the Nebraska Wheat Development, Utilization and Marketing Board provide key financial support for this research. Without the Wheat Board's support, much of the state breeding efforts would be curtailed and many of the wheat quality analyses to evaluate our breeding material would not be available.

II. THE 2013-2014 NEBRASKA WHEAT CROP

1. Growing Conditions

The 2013-2014 growing season began with adequate moisture in most parts of the state. Adequate moisture continued for most of the state, but the southwest and west continued to have drought conditions in the early spring. Overall, the temperatures were near normal and the season would be considered as being close to average. Towards the end of the season, most of the crop had adequate to surplus moisture and those plants that were not injured early by the sporadic drought did very well. Overall, many wheat fields were very short due to the drought, but finished extremely well due to late rains.

2. Diseases

In 2014, drier than normal weather and cool temperatures early in the growing season delayed development of foliar fungal diseases. In addition, the amount of rust spores blowing in from southern states was small. As a result, foliar fungal disease levels were generally low during most of the growing season. Leaf rust arrived in mid-June in south central and southeastern Nebraska, which was much later than its normal arrival time of mid- to late May. Statewide, levels of leaf rust were low. Other fungal diseases observed during the 2014 growing season included loose smut, common bunt, tan spot, Septoria tritici blotch, powdery mildew, and trace levels of Fusarium head blight (scab). Bacterial streak, also known as black chaff when it affects heads of wheat and other small grains, was the predominant disease in the eastern half of the state. At the Agricultural Research and Development Center (ARDC) near Mead and at Havelock Research Farm in Lincoln, very severe levels of bacterial streak were observed in wheat, oats, and triticale in breeding nurseries. Wheat soilborne mosaic virus (WSBMV) occurred sporadically in southeast Nebraska early in the growing season, but at much lower levels than in 2013. As temperatures warmed up, symptoms of wheat streak mosaic virus (WSMV) and Triticum mosaic virus (TriMV) became more noticeable. Levels of virus diseases were generally low except in two fields in the southern Panhandle where high incidence and severity of wheat streak mosaic virus were observed in June. Freeze injury was observed in some wheat fields throughout the state, but it was not as extensive as that observed in 2013. Drs. Stephen Wegulo (plant pathologist), Jeff Bradshaw and Gary Hein

(entomologists monitoring insect vectors of disease), and Satyanarayana Tatineni (USDA-ARS virologist) continue to be invaluable in disease identification, survey, and understanding.

3. Insects

Nebraska continues to have small outbreaks of Hessian fly and the diseases vectored by aphids or mites (specifically wheat streak mosaic virus and the other mite transmitted viruses and barley yellow dwarf virus) However the major concern remains the continued spread of wheat stem sawfly into Nebraska. This is an emerging pest and currently the most used resistance mechanism is through plant breeding (solid stem lines) carries with it a yield drag. Hence, in collaboration with Montana State University and Colorado State University, we are looking for novel resistance genes and mechanisms. Unfortunately, breeding for this insect pest will require more time and resources in the future. We are past the stage of wondering if it will come and find a home in Nebraska. The Entomology Program at the UNL Panhandle Research and Extension Center continues to work with the UNL Wheat Breeding Program to evaluate existing and new sources of resistance. Our 2014 Wheat Stem Sawfly Survey shows a continued geographic expansion of the wheat stem sawfly into Nebraska (Table 1). We have recorded several individual field locations with as high as 100% infestation within the sampled area. Survey efforts were expanded in 2014 to more sites across different counties in Nebraska.

Table 1. Mean proportion infested stems and number of fields sampled (in parenthesis) of wheat stem sawfly larvae from 2011-2014 in Nebraska and select adjacent Colorado and Wyoming counties. Means are based on 25 subsamples of 100 total wheat tillers randomly collected from field edges for each location (99 site years).

State	County	2011	2012	2013	2014
Colorado	Logan	--	0 (1)	0.3 (1)	0.8 (1)
	Sedgewick	--	0 (1)	0 (1)	--
Nebraska	Banner	7.6 (7)	13.3 (6)	13.1 (3)	21.8 (1)
	Box Butte	3.5 (6)	9.2 (4)	18.1 (4)	23.8 (1)
	Chase	--	--	--	0 (1)
	Cheyenne	2.8 (4)	12.3 (1)	15.5 (1)	19.3 (1)
	Dawes	--	7.5 (1)	7.5 (1)	13.8 (1)
	Deuel	--	0 (1)	--	--
	Franklin	0 (2)	0 (2)	0 (1)	--
	Garden	0.3 (1)	0.3 (1)	0 (1)	1.5 (1)
	Gosper	0 (2)	0 (2)	0 (2)	0 (2)
	Harlan	--	--	--	0 (1)
	Kearney	--	--	0 (1)	--
	Kimball	--	--	--	1.8 (1)
	Morrill	5.1 (2)	6.8 (2)	22.1 (2)	18.3 (1)
	Perkins	--	--	--	0 (1)
	Scotts Bluff	--	14.5 (3)	13.9 (4)	20.8 (1)
	Sheridan	0 (2)	0.2 (3)	3.5 (2)	1.3 (1)
	Sioux	--	0.5 (1)	--	0 (1)
Wyoming	Laramie	8.1 (2)	11.9 (2)	21 (2)	--

Work is underway to develop a laboratory colony of stem sawfly that could greatly expedite our cultivar evaluation timeline. Current stem sawfly resistant traits rely on solid stem traits for resistance. However, recent data from Nebraska (Table 2) indicates some variability in this trait between localities. This variability may in turn impact the reliability of this trait for stem sawfly resistance. Pith expression in wheat is somewhat determined by light intensity during development; therefore, it can vary accordingly. Montana has also noted this variability across their landscape as well.

Table 2. Mean (±SEM) wheat pith solidness ratings for select wheat varieties from State Variety Test Plots from three Nebraska counties. Ratings are from 5-25; where 5 = hollow and 25 = solid. Means based on 3 stems from five plants from four replicate plots per location. Varieties with an asterisk are generally referred to as "solid stem" varieties.

Variety	Deuel	Cheyenne	Dawes
Freeman	8±0.65	10±0.77	7±0.67
Warhorse*	19±1.08	25±0.17	18±1.31
Judee*	17±0.93	24±0.14	18±0.34
Bearpaw*	21±0.87	23±0.42	18±0.89
Pronghorn	6±0.3	8±0.74	6±0.66
Goodstreak	6±0.12	8±0.59	6±0.43
Hatcher	7±0.29	8±0.66	6±0.53

Lastly, for 2013 and 2014 we conducted a cage-infestation variety screen test (Table 3, "Cage") and evaluation of stem sawfly larval infestation in the Box Butte County State Variety Test (Table 3, "Field") for select varieties. All wheat varieties can become infested with the wheat stem sawfly (including solid stem varieties). However, mortality factors such as beneficial organisms and host-plant traits can limit the ability for a sawfly larva to complete development into a prepupa and eventually and adult wasp. Both variables (infestation and larval survival) are key to understanding both mechanisms of host plant resistance and the integration of these traits into the agricultural ecosystem. In our "cage" studies a limited number of stem sawflies are introduced into cages containing a few varieties. In our "Field" study, natural populations (usually much larger number than our "cage" study) have access to a large number of varieties (many more than we sample). Therefore, in both studies sawflies adults can make a choice as to where they deposit their eggs, but on much different land areas. It is clear from both studies that the solid-stem varieties (Bearpaw, Judee, and Warhorse) significantly reduce the survival of the wheat stem sawfly compared to many (but not all) hollow-stem varieties. In 2014, based on both "Cage" and "Field" studies, the wheat variety Warhorse had 0-9% stem sawfly survival and appears to be the most resistant of the wheat varieties we have tested thus far. It may also be noteworthy that some conventional hollow-stem varieties (e.g., Goodstreak) may have either a high stem sawfly mortality or a reduced insect preference. Lastly, in 2014, we included two barley varieties (Sidney and Stoneham – both are Russian wheat aphid resistant) to evaluate their susceptibility to stem sawfly. Neither barley variety had any evidence of infestation. Therefore, we are working with the UNL Wheat Breeding Program to evaluate some conventional wheat-barley crosses for potential novel sources of stem sawfly resistance.

Table 3. Mean percentage (±SEM) of wheat tillers with wheat stem sawfly frass (Infest) or with live larvae or prepupae (Larvae) for select winter wheat varieties and two barleys* for artificially-infested, common-garden plots (Cage) or from the Box Butte State Variety Trial (Field). Different letters between means within a column in a study indicate a

significant difference at p-val < 0.05.

		2013		2014	
Cage	Variety	Infest (%)	Larvae (%)	Infest (%)	Larvae (%)
	Bearpaw	29.4 ± 0.2	7.1 ± 0.1	14 ± 0.1cd	8.7 ± 0.1cd
	Freeman	42.3 ± 0.25	4.2 ± 0.05	51.1 ± 0.2a	18.2 ± 0.05abc
	Goodstreak	23.6 ± 0.1	0 ± 0	9.6 ± 0.05cd	1.5 ± 0.05d
	Hatcher	37 ± 0.15	29.9 ± 0.15	33.2 ± 0.05ab	26.1 ± 0.1a
	Judee	17.3 ± 0.2	1.9 ± 0.05	6.9 ± 0.05d	4.4 ± 0.05d
	Kharkof	39.6 ± 0.25	8.3 ± 0.1	6.3 ± 0.05d	4.8 ± 0.05d
	Overland	32.7 ± 0.2	14.9 ± 0.15	26 ± 0.1bc	11.5 ± 0.1bcd
	Pronghorn	22.3 ± 0.15	10.9 ± 0.1	34.6 ± 0.05ab	21.5 ± 0.05ab
	Robidoux	20 ± 0.15	0 ± 0	9.6 ± 0.1cd	3.8 ± 0.05d
	Sidney*	--	--	0 ± 0d	0 ± 0d
	Stoneham*	--	--	0 ± 0d	0 ± 0d
	Turkey	--	--	11.1 ± 0.05cd	7.9 ± 0.05cd
	Warhorse	--	--	4.2 ± 0.05d	0 ± 0d
Field	Variety	Infest (%)	Larvae (%)	Infest (%)	Larvae (%)
	Bearpaw	--	--	38.7 ± 0.1d	18 ± 0.1de
	Freeman	36 ± 0.1c	2 ± 0.05d	63.3 ± 0.1c	29.3 ± 0.1bcd
	Goodstreak	42 ± 0.1c	20 ± 0.1bc	58.7 ± 0.1c	36 ± 0.1b
	Hatcher	61.5 ± 0.05ab	38.5 ± 0.1a	78.7 ± 0.05ab	52.7 ± 0.05a
	Judee	--	--	62.7 ± 0.05c	26 ± 0.05bcd
	NE09521	39 ± 0.1c	17 ± 0.1bcd	65.3 ± 0.1c	38 ± 0.1b
	Overland	72 ± 0.1a	34 ± 0.15ab	86.7 ± 0.05a	60.7 ± 0.1a
	Pronghorn	50 ± 0.1bc	7.5 ± 0.05cd	55.3 ± 0.1c	22.7 ± 0.1cd
	Robidoux	70 ± 0.1a	37.5 ± 0.1a	67.3 ± 0.05bc	36.7 ± 0.1b
	Turkey	48 ± 0.1bc	27 ± 0.1ab	60.7 ± 0.05c	33.3 ± 0.05bc
	Warhorse	--	--	28.7 ± 0.1d	9.3 ± 0.05e

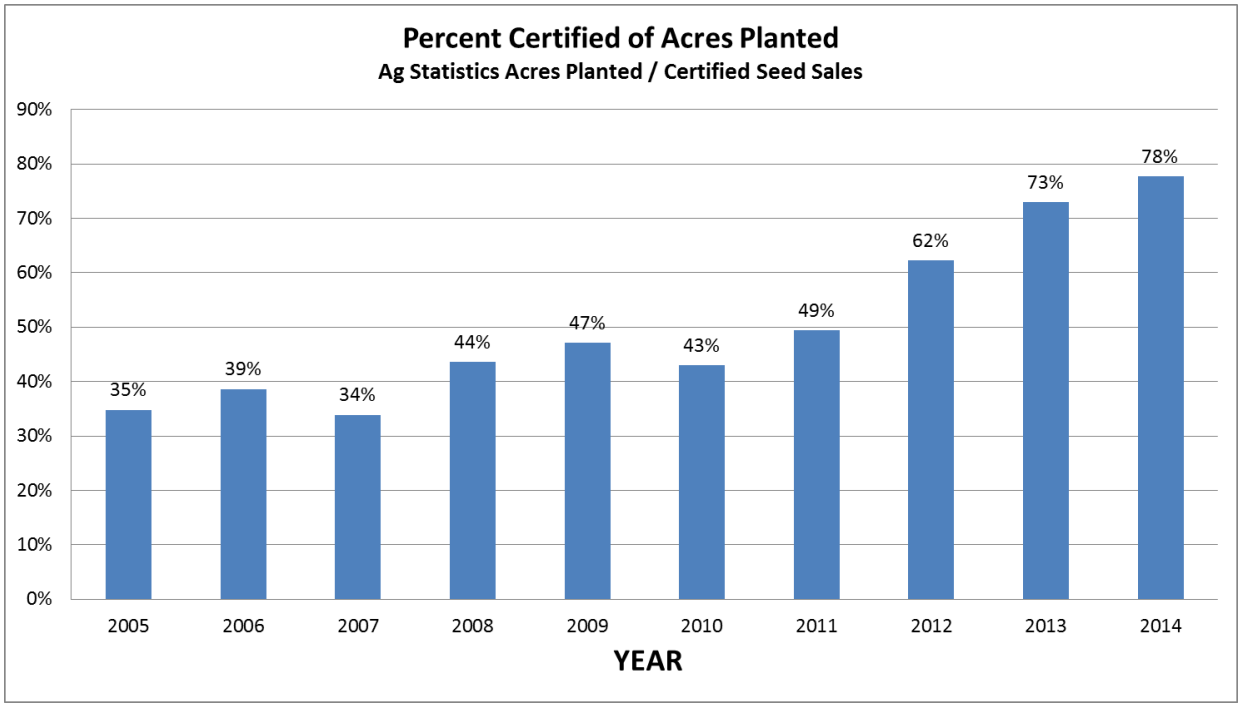
4. Wheat Production

In 2013-2014 season, 1,550,500 acres of wheat were planted in Nebraska and 1,450,000 were harvested with an average yield of 49 bu/a for a total production of 71,050,000 bu. This production was almost 180% higher than the 2012-2013 crop which bodes well for wheat producers. In 2012-2013 season, 1,470,000 acres of wheat were planted in Nebraska and 1,130,000 were harvested with an average yield of 35 bu/a for a total production of 39,550,000 bu. The 2012-2013 crop was one of the smallest crops in the last 50 years and certainly highlighted the effect of drought. In 2012, 1,380,000 acres of wheat were planted in Nebraska and 1,300,000 were harvested with an average yield of 41 bu/a for a total production of 53,300,000 bu. Despite continued genetic improvement, the main determinant in wheat production seems to be acres harvested, government programs, the price of corn, and weather (which also affects disease pressure and sprouting). This is an economic reality in understanding wheat yields and productivity in NE.

5. Cultivar Distribution

Nebraska did not take a variety survey in 2014, but has resumed the survery in 2015 (which has not been reported yet). In 2014, Settler CL (a one-gene Clearfield wheat) had the most reported acres of production followed by Overland, then Brawl CL+ (a two-gene Clearfield wehat), then Robidoux, Byrd, and Infinity CL ((a

one-gene Clearfield wheat). As Clearfield wheats require 100% certified seed planted every year, the total acreage of a variety within the state may more for non-Clearfield wheat varieties that have some growers' planting back their harvested seed. It should be noted that many commercial lines do not report their seed production for proprietary reasons, so without the survey it is impossible to know how much of those varieties are produced within the state. One important aspect is that using a "back of the envelope approach", the Nebraska Crop Improvement Association which has full access to certified seed production records estimated that enough seed was produced in Nebraska to plant 78% of our wheat acreage. Nebraska has been a leader for planting certified seed, but this is major change since 1986 when I came to Nebraska and approximately 25% of the wheat acres were sown to certified seed. In 2012-2013, using seed sales of certified seed, the top 10 lines were: Settler CL (15.4%), Overland (12.4%), Tam 111 (9.4%), AP502CL2 (6.3%), Winterhawk (5.6%), Wesley (5.1%), Pronghorn (5.0%), Infinity CL (4.3%), Art (3.6%), and Camelot (3.3%). In 2012, TAM 111 (12.8%) inched ahead of Overland (12.7%) as the most widely grown wheat cultivar in Nebraska, followed by Pronghorn (9.6%). Pronghorn and Goodstreak (5.1%) are tall (conventional height) wheat varieties that have consistently done well in the drought prone areas of western Nebraska. Buckskin (4.7%) decreased slightly, indicating that tall wheats, which are adapted to drought in the west, remain very popular (19.4% of the total state acreage).



While no wheat listed below has all of the characteristics of an ideal wheat, the diverse wheat varieties provide the grower an opportunity to choose high yielding, high quality wheat varieties that have resistance or tolerance to the diseases or insects prevalent in his or her region. Cultivars developed by the University of Nebraska wheat improvement program occupied 65.6% of the state acreage in 2012. Other public varieties occupied 17.4% (largely due to TAM 111) and private varieties occupied 17.0% (note the private cultivars do not include TAM 111 which was developed by Texas A&M but is marketed by Agripro) of the state acreage. What is interesting is that no variety dominated the acreage. Variety diversity is useful, as it should reduce genetic vulnerability to disease and insect pests.

----------**Percent**----------

Variety	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
2137	10.3	7.8	4.3	**3.5**	1.4	2.1	1.7			

2145				**1.0**	1.2	2.2				
Above				**1.3**						
Agripro Abilene	1.4	1.7	1.7		1.0					
Agripro Art								2.4	4.3	3.6
AgriPro AAP503 CL										1.1
AgriPro Dumas					1.4	1.2				
Agripro Hawken							1.2	2.1		
Agripro Jagalene		4.5	16.8	**23.8**	33.4	20.9	13.8	8.5	5.4	2.4
Agripro Ogallala	3.6	2.4	2.0	**1.4**	1.0	1.1				
Agripro Postrock						1.1	4.1	4.4	3.3	2.4
Agripro Thunderbird	1.8									
Agripro Thunderbird								1.1		
Agripro Thunderbolt	2.0	3.0	1.9	**1.9**	2.0	2.4	1.6	1.5	2.2	
Akron	1.2									
Alliance	11.5	13.6	10.1	**10.1**	7.2	6.1	6.1	6.0	3.9	3.7
Arapahoe	8.7	6.8	5.2	**2.9**	2.0	3.4	2.2	2.1	1.5	
Armour									1	2.6
Bond CL										1.1
Buckskin	7.3	4.9	3.7	**5.0**	3.5	3.4	3.3	4.5	5.9	4.7
Camelot									1.1	2.3
Centura	1.8	2.1	2.4	**1.9**	1.3	1.0				
Culver	2.5									
Goodstreak			1.7	**3.7**	3.6	5.1	5.0	6.5	4.4	5.1
Hatcher							1.2	1.5	1.8	2.1
Hawken									1.5	
Infinity CL						2.3	3.5	3.7	3.3	4.3
Jagger	3.9	2.8	3.1	**2.5**	1.7	1.5	1.1			
Karl/Karl 92	3.8	3.3	2.7	**2.7**	1.6	2.9	2.5	1.6	2.1	1.4
Millennium	6.1	11.1	10.7	**9.5**	7.2	9.4	13.2	11.9	7.6	5.9
Niobrara	5.4	3.5	2.2							
Overland							3.4	5.6	10.8	12.7
Overly					1.0	1.1				
Platte	1.0	1.3	1.6							
Pronghorn	10.3	10.4	11.4	**10.1**	12.2	10.6	12.1	13.7	10.4	9.6
Scout & Scout 66	1.1									
Settler CL										4.7
Siouxland	1.4									
TAM 111				**1.2**	1.6	3.2	6.5	7.4	8.1	12.8
TAM 112									1.2	
Vista	1.2									
Wahoo	1.8	1.7	1.8	**1.8**	1.1	1.5	1.1			
Wesley	3.6	5.9	5.5	**5.8**	7.2	7.7	4.8	4.1	4.2	2.0
Winterhawk									1.3	3
Z Other Private Varieties	3.4	4.4	4.0	**3.8**	2.8	4.1	5.0	3.6	5.4	4.5
Z Other Public Varieties	4.9	8.8	7.2	**6.1**	4.6	5.7	6.6	7.8	9.3	8.0
Total	100	100	100	**100**	100	100	100	100	100	100

6. New Cultivars

Based upon seed producers input the line NE05548 was recommended for release and formally released in January 27, 2014 as Husker Genetics Brand Panhandle. It was described in our previous annual report (available at: http://agronomy.unl.edu/documents/4128273/6410994/WheatAnnualReport2013.pdf) and will not be described here. In our work on nitrogen use efficiency (NUE) and mineral content in wheat (part of the TCAP project), we identified Panhandle as being a low Cd accumulating line. Cd is a toxic element and regulated in food. We also discovered that Freeman, the release before Panhandle is very good for NUE. It scavenges N better than other commercial cultivars. No other wheat line was recommended for release in 2014 though one line was recommended to licensing to our organic wheat community (NW07505, see below).

III. FIELD RESEARCH

1. Increase of New Experimental Lines

A number of lines are under increase for possible release in 2015 or 2016. NW07505 is a hard white semi-dwarf wheat that is derived from the cross Trego/Thunderbolt. It segregates for resistance to stem rust, is moderate resistant to leaf rust and wheat soilborne mosaic virus. It is moderately susceptible to stripe rust and susceptible to hessian fly, greenbug, black point, and barley yellow dwarf virus. In years when common bunt(stinking smut) was present in our organic tests, NW07505 was generally bunt free indicating it is more resistant (based on data so far) to common bunt than many other lines we tested under organic conditions. One of its attributes is that it has above average quality at low protein levels. In organic production systems, it is often difficult to grow high protein lines, so having good end-use quality under organic production systems is very important. .

NE07531 is derived from the cross HBA142A/HBZ//Ale (=HBK0630-4-5)/3/NE98574 (=CO850267/Rawhide)/4/Hallam. The HB... lines were lines gifted to Kansas State University by Pioneer when Pioneer reduced its hard red winter wheat breeding effort. NE07531 seems best suited for south central and southwestern Nebraska, as well as potentially irrigated production in western NE. It is moderately resistant to stem, leaf, and stripe rust, wheat soilborne mosaic virus, and acid soils. It has some tolerance to Fusarium head blight. It is susceptible to wheat streak and triticum mosaic virus, and Hessian fly.

NE09517 is derived from the cross Jagger/Thunderbolt//Jagalene. NE09517 seems best suited for central to western Nebraska. It is resistant to stem rust, moderately resistant to stripe rust, and moderately susceptible to leaf rust. It is susceptible to barley yellow dwarf virus, soilborne wheat mosaic virus, Septoria tritici, and bacterial leaf streak, Hessian fly, and acid soils.

NE09521 is derived from the cross OK96717-99-6755/NI01824//NE00564 where the pedigree of OK96717-99-6755 is Abilene/2180//Chisholm, the pedigree of NI01824 is Intensivnaja/NE92458 (=PL83201/Redland)//VBF0168), and the pedigree of NE00564 is T81/NE91635 (=NE82671/NE82599). NE09521 is a moderately early, moderately tall, semi-dwarf wheat with average straw strength. It is moderately resistant to resistant to wheat stem rust; moderately resistant to moderately susceptible to stripe rust and wheat soilborne mosaic virus; moderately susceptible to leaf rust and barley yellow dwarf virus; and susceptible to Hessian fly, greenbug, bacterial leaf streak, and wheat streak mosaic virus. It was tested in the SRPN in 2012 and 2013 (data available at http://www.ars.usda.gov/Research/docs.htm?docid=11932) and in the Nebraska State Variety Trials (data available at: http://cropwatch.unl.edu/web/varietytest/wheat). Based upon the data we have collected so far, NE09521 seems to be adapted to the Northcentral and Northern High Plains and best suited for production in eastern Nebraska and states south and west of Nebraska where disease resistance is less needed. Based upon our end-use quality data to date, NE09521

would be lower in test weight and have average end-use quality. This line is being considered for release to certified seed producers in 2015. Compared to Wesley (moderately susceptible to susceptible for scab reaction and susceptible for DON accumulation) and Overland (moderately resistance to scab reaction and moderately resistant for DON accumulation), NE09521 is considered as being moderately resistant for scab reaction and susceptible for DON accumulation.

NE10589 is derived from the cross OK98697/Jagalene//Camelot. It has good testweight, is a taller semidwarf with medium late maturity. It is resistant to susceptible to Hessian fly, moderately resistant to stem, leaf, and stripe rust and bacterial streak. By markers it may have the Lr37/Sr38/Yr17 translocation. This line seems to be very broadly adapted and was selected using phenotypic and genomic selection. This is my favorite line by yield and genomic selection. In considering its yield and test weight, in head to head comparisons, it was the best yielding line in my program of those lines near release.

		Yield			Test Wt.	
	Trials	% of NE10589	Significance	Trials	% of NE10589	Significance
Camelot	29	89	***	14	99	ns
Goodstreak	29	85	***	14	99	ns
Panhandle	19	87	***	8	98	ns
Freeman	19	96	**	8	97	**
NE07531	19	93	***	8	98	**
NE09517	20	94	**	8	101	ns
NE09521	20	93	***	8	99	ns
Robidoux	19	95	*	8	100	ns
NW07505	19	94	**	8	99	ns
Overland	29	95	**	14	100	ns
Settler CL	19	91	**	8	100	ns
Wesley	24	87	***	12	98	**

With the release of new varieties Overland, Camelot, Freeman, Goodstreak, McGill, Panhandle, Robidoux, and Settler CL, many of the most advanced current breeding lines are not expected to be released.

2. Nebraska Variety Testing

Numerous entries were included in some or all of the locations in the Fall Sown Small Grain Variety Tests in 2014. Twelve dryland, and one irrigated locations in Nebraska were harvested for yield data.

In 2014, the top ten entries for dryland production (11 environments) were:

Dryland	Yield		Yield
Entry	bu/a	Entry	bu/a
NE10589	61.7	NE07531	58.7
LCS Mint	60.9	Freeman	57.8
Overland	59.5	Camelot	56.9
NE09521	59.4	T158	56.8

NE09517	59.3	NE10478	55.8

As would be expected the two lowest yielding lines were Scout 66 (46.3 bu/a) and Turkey (47.8 bu/a) which were 25% and 23% lower yielding (respectively) than the highest yielding line. That Turkey had a highrer yield than Scout 66 may be due to the late rains, which favored late cultivars.

In 2013, the top ten entries for dryland production (11 environments) were:

	Yield		**Yield**
Entry	bu/a	Entry	bu/a
LCS Mint	57.03	NE06607	55.07
Overland	55.82	NE08499	54.88
NE09517	55.28	T158	54.81
NE09521	55.24	NI08708	54.80
Freeman	55.17	BL11002	54.40

As would be expected the two lowest yielding lines were Scout 66 (44.38 bu/a) and Turkey (42.10 bu/a) which were 22% and 26% lower yielding (respectively) than the highest yielding line.

In 2012, the top ten entries for dryland production were:

	Yield		**Yield**
Entry	bu/a	Entry	bu/a
NE06545	59.31	WB Armour	55.38
SY Wolf	58.60	NI08708	55.13
McGill	56.44	NW0366	55.08
Overland	55.78	NE08659	55.06
Mattern	55.53	Settler CL	54.96

3. Irrigated Wheat Trials:

In 2014, only the site at Hemingford was harvested.

The top ten lines in 2014 were:

Entry	Yield	Entry	Yield
	bu/a		bu/a
WB-Grainfield	126.7	Brawl CI Plus	119.5
WB-Cedar	125.3	NE10478	119.4
Denali	123.7	Wesley	119.3
WB4458	121.9	NX04Y2107W	118.8
Byrd	120.3	Antero	117.7

As compared to 2013 this trial would be considered very high yielding and it is interesting to see how the rankings change with the overall environmental level. When breeding for higher grain yield potential, irrigated wheat trials are very helpful.

In 2013, only the site at Hemingford was harvested.

The top ten lines in 2013 were:

	Yield		**Yield**
Entry	bu/a	Entry	bu/a
SY Wolf	114	NW07505	110
NE09517	114	Mattern	108
LCH08-80	112	T163	108
Anton	110	NI06736	108
Armour	110	Panhandle (NE05548)	107

The irrigated data this year continues to show the benefits of having a dedicated irrigated wheat development nursery to select lines that have excellent performance (e.g. NI06736). Interestingly, Panhandle, a very tall semi-dwarf wheat, did well in this trial, which may indicate that it has a higher potential than our conventional tall wheat cultivars, when the conditions are right.

The top ten lines in 2012 were:

	Yield		**Yield**
Entry	bu/a	Entry	bu/a
WB-Aspen	86.87	NI07703	77.80
Brawl CL Plus	85.10	NE06430	77.80
Anton	82.63	SY-Wolf	76.57
WB- Armour	79.17	Byrd	76.47
Mattern	78.13	Settler CL	75.73

As in the past, we have an experimental line irrigated nursery, which grows under irrigation in western Nebraska and under dryland conditions throughout the state. The goal of this nursery is to identify higher yielding lines under irrigation and under higher rainfall conditions, which periodically occur in Nebraska. In 2014 (next page), we were able to harvest all of the e dryland sites (Lincoln, North Platte, and Alliance) and the irrigated site (Hemmingford, NE). We have made considerable progress in reducing height and lodging, but additional disease resistance is needed. The data is color coded with dark green having the greatest values and red having the lowest values. It should be noted that the tallest wheats will be coded red (undesirable for this nursery), while the highest yielding and test weights, will be in dark green. The yield data from Lincoln was not correlated with the data from Alliance or the irrigated site, however, the yield data from Alliance was weakly correlated with the data from the western irrigated site indicating some similarities among the sites and that the rainfed site at Alliance received enough moisture to partially mimic the irrigated site. The alternative explanation is that both suffered from wheat stem sawfly infestation which may have made the yields are both site more similar. The correlation among rainfed and irrigated trials, indicated that the no trial could explalin more than 25% of the variation in another trial. Hence the continued testing in different locations is warranted because each location is giving us new data. The data from 2014 are:

entry	Name	Dryland Lincoln Yield bu/a	Dryland Nplatte Yield bu/a	Dryland Alliance Yield bu/a	Dryladn Average Yield bu/a	Rank	Irrigated Hemmingford Yield bu/a	Rank	Test Weight Average lbs/bu	Height Average in
1	Antelope	68.2	39.6	57.1	54.97	31	113.6	13	60.25	32.23
2	NI04421	78.9	41.2	54.8	58.30	17	83.7	39	58.70	34.05
3	NI08707	78.6	49.6	63.4	63.87	2	116.7	12	58.30	32.40
4	NI09707	74.1	46	64.5	61.53	6	103.1	33	59.85	31.80
5	NI10718W	73.6	44.5	60.9	59.67	8	105.8	29	57.85	33.30
6	NI10720W	80.9	49.4	44.1	58.13	18	108.5	25	59.25	34.53
7	WESLEY	71.1	46.9	59.9	59.30	10	110.1	22	59.00	30.95
8	NW07534	69.9	51.1	53.1	58.03	20	120.4	5	59.00	31.33
9	NI12713W	66	44.6	53	54.53	33	122.2	4	60.45	33.75
10	NI13703	70.2	39	57.1	55.43	30	91.7	36	60.15	32.73
11	NI13704	65.7	37.2	63.9	55.60	29	117.9	10	60.40	31.83
12	NI13705	63	42.3	51.8	52.37	40	110.3	21	61.00	32.98
13	NI13711	70.5	42.5	57.3	56.77	25	100.7	34	60.25	33.15
14	NI13713	69.8	40.2	48.7	52.90	37	104.5	31	58.80	31.55
15	Settler CL	72	47.4	56.6	58.67	16	113.5	14	58.85	32.40
16	NE09481	68.7	44.5	44.1	52.43	39	91.3	37	59.25	31.23
17	NI13717	71.6	48.9	65.8	62.10	5	125.6	1	59.50	33.83
18	NI13720	72	39.6	51.6	54.40	34	113	16	59.60	30.33
19	NI14719	64.3	44.5	55.9	54.90	32	119.7	7	59.50	29.88
20	NI14720	62	47.7	67.5	59.07	14	112.4	17	58.35	32.93
21	NI14721	72.3	53.1	69.4	64.93	1	110.6	19	59.60	33.35
22	NI14722	72.1	42.1	54.9	56.37	28	118	9	59.00	30.00
23	NI14723	70.5	44.1	63	59.20	12	108.2	26	61.45	32.48
24	NI14724	69.7	39.7	64.8	58.07	19	117	11	59.95	35.33
25	Anton	69.6	41.9	60.4	57.30	23	108.6	24	58.40	31.55
26	WB CEDAR	64.7	38.4	54.7	52.60	38	110.6	19	59.70	28.85
27	NI14727	76.5	41.6	59.5	59.20	12	118.1	8	59.95	34.90
28	NI14728	70.6	42.2	49.2	54.00	36	113.1	15	59.15	31.73
29	NI14729	72.9	48	66.4	62.43	4	108.7	23	60.55	34.08
30	NI14730	74.1	39.8	56.6	56.83	24	111.7	18	60.10	33.93
31	NI14731	70.2	46.5	55.7	57.47	22	106.8	27	59.00	34.93
32	NI14732	66.6	44.4	52.2	54.40	34	120.2	6	58.10	31.13
33	NI14733	68.7	46.9	72.7	62.77	3	122.8	3	59.50	36.23
34	NI14734	75.3	40.2	53.9	56.47	26	87.6	38	58.55	34.45
35	NI14735	74.5	46.3	57.3	59.37	9	94.4	35	59.25	33.33
36	NI14736	75.7	44.1	49.5	56.43	27	82.9	40	58.40	33.68
37	NI14737	74.9	45.6	53.3	57.93	21	104.8	30	58.75	32.25
38	NI14738	68.6	45	63	58.87	15	106.1	28	60.25	30.98
39	NI14739	61.8	50.8	65.1	59.23	11	103.7	32	58.70	30.03
40	SY Wolf	73.6	47.9	62.8	61.43	7	125.1	2	59.20	32.03
	GRAND MEAN	70.84417	44.38	57.89333			109.1			
	LSD	7.59559	6.81723	10.38016			19.1			
	CV	6.59576	9.3951	11.0302			10.7			
	Heritability	0.36551	0.34889	0.4305			0.3			

Data from 2013:

	Lincoln	Alliance	Dryland Avg.	Rank	Sidney Irr.	Rank	Testweight	Height Avg
Name	bu/a	bu/a	bu/a		bu/a		lbs/bu	in
Antelope	68.5	42.4	55.45	37	93.5	35	61.3	34.10
NI04421	66.5	52.7	59.60	18	111.1	2	62.9	34.13
NI06736W	81.5	48.3	64.90	5	99.5	25	61.7	32.30
NI06737W	72.2	42.1	57.15	32	101	23	62.4	33.70
NI07703	69.2	48.8	59.00	22	101.4	22	61.9	33.87
NI08707	67.8	53.3	60.55	15	109.9	3	60.8	32.67
NI08708	71.3	46.5	58.90	23	104.7	15	61.4	33.10
NI09707	65.3	48.7	57.00	33	109.7	4	61.6	31.73
NI09710H	76.8	49.7	63.25	7	95.3	33	60.1	33.23
NI10707	67.9	47.8	57.85	29	98.3	28	61.2	36.17
NI10712	64.3	49.0	56.65	34	107.7	6	61.4	35.50
NI10718W	67.5	54.6	61.05	13	107.1	7	62.5	34.43
NI10720W	68.5	50.8	59.65	17	112.3	1	62.8	33.43
WESLEY	74.0	48.2	61.10	12	103.8	17	61.2	33.17
Settler CL	69.8	46.9	58.35	28	106.2	13	61.8	32.83
NE09481	73.4	51.7	62.55	10	103.9	16	62.5	32.80
NW07534	65.1	48.2	56.65	34	106.3	12	61.2	31.37
NI12702W	84.9	45.8	65.35	2	85.8	38	61.6	34.33
NI12709	81.0	45.0	63.00	8	99.3	26	62.6	33.97
NI12713W	72.4	43.0	57.70	30	99.3	26	62.2	34.27
NI13701	58.5	44.8	51.65	39	76.7	40	61.3	36.57
NI13702	56.1	40.8	48.45	40	86.4	37	62.3	36.53
NI13703	73.1	52.7	62.90	9	106.9	9	63.4	33.87
NI13704	72.0	44.7	58.35	27	105.1	14	61.6	34.73
NI13705	72.6	47.5	60.05	16	106.6	10	63.7	34.90
NI13706	80.1	50.0	65.05	3	98.3	28	61.8	32.57
NI13707	69.5	48.2	58.85	24	103.3	18	62.6	31.43
NI13708	76.5	53.6	65.05	3	95.4	32	62.6	31.80
NI13709	68.3	41.1	54.70	38	94.3	34	60.8	35.10
NI13710	68.2	44.8	56.50	36	106.6	10	63.8	33.43
NI13711	71.4	49.7	60.55	14	107	8	62.9	34.97
NI13712	68.6	48.9	58.75	25	102.2	21	63.1	33.47
NI13713	71.6	47.6	59.60	19	102.4	20	63.5	33.70
NI13714	75.2	43.5	59.35	20	92	36	62	33.10
NI13715	68.0	46.5	57.25	31	100.6	24	61.5	35.93
NI13716	74.9	47.9	61.40	11	96	30	61.6	34.53
NI13717	81.3	48.3	64.80	6	108.7	5	62.4	35.33
NI13718	69.5	47.4	58.45	26	85.7	39	60.6	33.77
NI13719	71.0	47.5	59.25	21	95.5	31	61.1	34.80
NI13720	83.6	47.5	65.55	1	102.5	19	61.9	31.10
Mean	71.45	47.66	59.555		100.72		61.99	
LSD	7.87	9.11	8.49		11.44		1.1	
CV	6.74	11.75	9.245		6.94		1.09	
Heritability	0.98	0.52	0.75		0.98		0.98	

Data from 2012:

	Lincoln	N. Platte	Alliance	Kansas	**Average**	**Rank**	**NE. Avg.**	**NE-Rank**	Height	Anthesis	TestWT
name	bu/a	bu/a	bu/a	bu/a	bu/a		bu/a		(in)	(Julian day	lbs/bu
Antelope	44.70	46.10	48.20	60.00	**49.75**	**33**	**46.33**	**30**	36.44	125.5	63.98
TAM111	50.20	52.30	51.70	71.10	**56.33**	**10**	**51.40**	**13**	24.80	118.9	52.23
WESLEY	52.20	45.90	52.90	61.60	**53.15**	**21**	**50.33**	**16**	29.11	128.5	57.87
NI04421	61.30	56.80	55.00	71.00	**61.03**	**1**	**57.70**	**3**	20.57	123.1	48.89
NI06736W	39.90	52.20	44.60	79.30	**54.00**	**19**	**45.57**	**33**	32.52	117.4	60.97
NI06737W	41.00	41.60	46.00	74.40	**50.75**	**29**	**42.87**	**37**	36.29	117.2	63.50
NI07703	45.50	49.70	48.00	82.10	**56.33**	**10**	**47.73**	**24**	27.24	117.9	56.38
NI08707	56.40	41.20	50.30	75.50	**55.85**	**13**	**49.30**	**20**	27.43	117.8	55.08
NI08708	54.80	51.00	54.30	74.40	**58.63**	**6**	**53.37**	**8**	22.46	119.1	49.85
NI08714	38.20	34.30	52.20	61.60	**46.58**	**40**	**41.57**	**40**	40.52	117.3	65.94
NI09703	57.90	41.60	52.50	58.50	**52.63**	**23**	**50.67**	**15**	29.56	125.1	56.55
NI09707	49.20	44.30	48.40	69.80	**52.93**	**22**	**47.30**	**26**	31.77	116.1	57.96
NI09710H	58.10	48.60	50.30	72.90	**57.48**	**8**	**52.33**	**10**	23.44	122.7	52.05
NI10703	50.80	40.90	41.00	59.30	**48.00**	**37**	**44.23**	**35**	38.74	123.2	65.65
NI10705	50.50	34.10	51.40	50.90	**46.73**	**39**	**45.33**	**34**	39.44	129.6	67.68
NI10707	48.30	42.90	48.80	69.10	**52.28**	**24**	**46.67**	**28**	32.89	118.6	59.83
NI10712	51.30	46.20	49.10	73.60	**55.05**	**16**	**48.87**	**21**	28.62	124.4	58.01
NI10718W	60.20	51.70	51.70	69.30	**58.23**	**7**	**54.53**	**6**	22.51	124	50.84
NI10720W	52.10	43.20	49.00	62.90	**51.80**	**27**	**48.10**	**22**	32.37	127.5	60.62
Settler C	54.60	49.10	51.80	81.80	**59.33**	**3**	**51.83**	**12**	22.28	121.4	51.89
NE08402	51.70	31.80	42.00	73.50	**49.75**	**33**	**41.83**	**39**	37.94	118.8	65.25
NE08410	49.00	32.20	44.90	64.30	**47.60**	**38**	**42.03**	**38**	39.34	119.9	65.75
NE08509	59.20	46.70	52.20	58.20	**54.08**	**18**	**52.70**	**9**	26.57	124	53.19
NE09481	55.40	45.30	55.90	80.60	**59.30**	**4**	**52.20**	**11**	22.40	116.2	49.87
NE09499	57.10	37.20	49.30	65.20	**52.20**	**25**	**47.87**	**23**	31.96	119.7	58.22
NW07534	66.80	57.20	50.80	69.20	**61.00**	**2**	**58.27**	**2**	20.76	123.8	48.85
NI12701	56.50	45.70	47.60	57.30	**51.78**	**28**	**49.93**	**17**	31.64	124.5	57.71
NI12702	65.70	60.20	50.20	60.50	**59.15**	**5**	**58.70**	**1**	21.57	127.9	50.16
NI12703	71.20	46.10	43.90	61.30	**55.63**	**14**	**53.73**	**7**	24.91	124.7	52.20
NI12704	50.00	44.40	43.90	61.10	**49.85**	**32**	**46.10**	**31**	36.37	124.3	63.89
NI12705	59.20	50.70	54.30	50.00	**53.55**	**20**	**54.73**	**5**	26.58	127.2	52.93
NI12706	50.50	50.50	52.20	76.60	**57.45**	**9**	**51.07**	**14**	24.69	116.9	51.86
NI12707	45.00	45.60	50.80	65.90	**51.83**	**26**	**47.13**	**27**	33.38	120	60.13
NI12708	48.60	38.00	44.60	70.80	**50.50**	**30**	**43.73**	**36**	36.58	122.5	65.03
NI12709	49.50	47.80	51.40	76.40	**56.28**	**12**	**49.57**	**19**	26.86	121.8	55.89
NI12710	53.60	37.60	48.50	57.50	**49.30**	**35**	**46.57**	**29**	36.86	124.7	63.52
NI12711	69.50	45.20	53.60	52.70	**55.25**	**15**	**56.10**	**4**	25.03	126.7	51.91
NI12712	54.10	40.10	48.50	58.10	**50.20**	**31**	**47.57**	**25**	34.52	126.1	61.87
NI12713	57.30	46.30	45.60	69.00	**54.55**	**17**	**49.73**	**18**	28.24	118.3	54.85
NI12714	42.00	41.70	53.50	59.40	**49.15**	**36**	**45.73**	**32**	37.91	122.3	64.07
GRAND M	**53.23**	**45.10**	**49.52**	**66.67**	**53.63**		**49.28**		**30.08**	**122.14**	**57.57**

The three year averages for the lines tested in all three years (2012-2014) is below. The importance of the sustained effort in irrigation is very obvious in that it provides us with a window into the highest yielding environments, something that rainfed environments rarely do. The mean yield of the lines in the irrigated environments (101 bu.a) is roughly twice the average of the rainfed environments for the same years. As can be seen in the table, Robidoux continues to be an excellent rainfed wheat with broad adaptation. Settler CL continues to be one of our most broadly adapted wheats from rainfed to irrigated. Additional wheat experimental lines perform well in either rainfed or irrigated production systems. The question will be can a wheat with excellent irrigated production capabilities have a sufficient market to warrant its release for irrigated production environments alone.

2012-	Linc.	N.Platte	Alliance	**Average**	**Dryland**	**Alliance IRR**	**IRR**
2014	Yield	Yield	Yield	**Yield**	**Rank**	Yield	**Rank**
	bu/a	bu/a	bu/a	**bu/a**		bu/a	
name						yb_sd11	
Antelope	60.47	42.85	49.23	52.25	**11**	97.60	**9**
NE09481	65.83	44.90	50.57	55.73	**7**	94.43	**10**
Robidoux	68.90	49.00	54.17	58.53	**1**	94.27	**11**
NI08707	67.60	45.40	55.67	57.91	**3**	105.87	**2**
NI09707	62.87	45.15	53.87	55.28	**9**	100.10	**7**
NI10718W	67.10	48.10	55.73	58.42	**2**	100.90	**5**
NI10720W	67.17	46.30	47.97	55.29	**8**	99.67	**8**
NI12713W	65.23	45.45	47.20	53.99	**10**	106.23	**1**
NW07534	67.27	54.15	50.70	57.65	**4**	104.07	**3**
Settler CL	65.47	48.25	51.77	56.28	**6**	103.53	**4**
WESLEY	65.77	46.40	53.67	56.91	**5**	100.57	**6**
Mean	**65.79**	**46.90**	**51.87**			**100.66**	

4. Nebraska Intrastate Nursery:

The 2014 Nebraska Intrastate Nursery (NIN) was planted at seven locations (Lincoln, Mead, Clay Center, McCook (added due to generous support from ConAgra, now Ardent Mills), North Platte, Sidney, and Hemingford, NE). All sites were harvested. A collaborative site was in Kansas (data not shown). The low yields at Mead were due to heavy and persistent rains which led to severe bacterial streak infections. Lincoln also had bacterial streak disease but it did not drastically reduce grain yield. The other tested sites all had normal to above normal grain yields. The quality of the trials was good and the CVs (coefficient of variation, a measure of error variation and the ability to separate lines statistically) were all good. Of the lines tested in 2014, NHH11569 (a two gene Clearfield line did particularly well). Unfortunately, when sprayed with herbicide it has an unacceptable injury level due to modifier genes of the two gene herbicide resistance. It should become a very valuable parent. Two other single gene lines (NH11489 and NH11490, all single gene lines have been dropped) were agronomically excellent and will become parents. NE09517 and NE10589 under increase for possible release continued to do very well. The value of the irrigated program continues to be shown in NI13706 which did very well in this nursery and was first identified in the IRDR nursery. Of the released lines, Overland, Camelot and Robidoux had very good years. Included in the data are data on bacteria streak tolerance. Overland, Freeman, and a number of other lines including NHH11569 are better for tolerance/resistance to this disease. As expected Cheyenne and Scout 66 were the lowest yielding lines in the trial, though ti was a surprise to see Cheyenne have a higher yield than Scout 66. As in the past, the correlation among sites ranged from r= -0.06 n.s. (n= 60, North Platte and Kansas) to a high of r =0.66** (n=60, Lincoln with Clay Center indicating in this year both sites provided somewhat similar data though either site could explain less than half of the variation at the other site. The low correlation between sites emphasizes that it is important to continue testing at all of our sites to represent the possible growing areas for our advanced lines.

2014	Mead	Linc.	ClayCen	McCook	Nplatte	Sidney	Alliance	**Average**		Average	Average	Average	Average	Average
	Yield	Yield	Yield	Yield	Yield	Yield	Yield	**Yield**	**Rank**	Testwt	Height	Hdate	WintSurv	BacStreak
name	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	**bu/a**						
WESLEY	25.7	70.0	51.5	87.6	58.3	56.2	66.9	**59.5**	**41**	60.2	30.8	148.4	100	5.7
OVERLAND	34.1	71.9	60.7	82.8	56.9	70.8	68.3	**63.6**	**16**	61.2	33.8	148.4	100	3.4
NE01481	26.7	68.3	49.0	87.2	56.4	73.8	50.5	**58.8**	**49**	61.1	33.5	148.0	100	5.9
NI04420	33.0	71.2	53.1	83.0	53.8	74.3	70.2	**62.7**	**20**	61.9	31.7	148.3	95	5.5
NE06430	31.4	72.1	47.5	82.5	54.6	64.0	59.6	**58.8**	**50**	61.0	32.2	147.7	98	6.2
NE06545	30.9	72.6	56.4	70.6	51.6	74.5	72.2	**61.3**	**30**	59.8	30.8	147.9	94	3.9
NE07486	33.2	73.9	50.8	81.4	49.5	70.4	62.8	**60.3**	**34**	61.1	31.4	147.5	100	4.4
NE07531	27.9	74.7	52.9	81.5	52.2	72.5	68.9	**61.5**	**27**	60.3	32.4	148.0	100	6.0
NE08499	34.7	72.7	56.9	80.4	45.4	66.9	61.2	**59.7**	**39**	60.5	32.4	147.7	95	3.8
NE09517	33.5	72.7	59.2	86.3	54.9	79.5	67.3	**64.8**	**8**	61.6	32.9	148.2	100	5.6
NE09521	31.9	69.4	55.0	80.5	55.1	71.3	57.9	**60.2**	**37**	60.8	34.0	148.1	89	5.6
NE10478	30.8	79.1	52.6	87.5	54.2	62.6	56.4	**60.5**	**32**	61.0	29.5	148.0	97	6.2
NE10507	34.1	76.2	53.4	87.8	56.9	77.2	52.7	**62.6**	**21**	59.7	32.8	148.0	98	4.9
NE10589	26.2	77.9	63.5	85.6	54.5	77.7	71.8	**65.3**	**4**	60.9	32.1	148.3	94	5.4
NE10683	35.6	73.2	59.5	91.9	60.5	73.0	61.9	**65.1**	**7**	58.3	33.4	148.7	100	5.5
NH11489	31.2	78.7	56.2	90.5	61.4	76.9	62.1	**65.3**	**5**	61.9	31.5	147.7	98	5.5
NH11490	31.3	79.1	62.9	91.9	57.0	70.3	65.1	**65.4**	**3**	61.8	29.9	147.3	100	5.8
NHH11569	43.9	77.9	68.4	86.2	56.5	77.0	64.7	**67.8**	**1**	60.7	33.3	147.7	97	3.2
NI09710H	21.9	70.1	45.6	89.9	62.1	61.7	64.3	**59.4**	**42**	58.7	31.0	150.1	100	6.5
NW03666	32.5	67.9	54.3	86.3	53.1	69.8	53.7	**59.7**	**40**	61.0	33.3	148.9	84	3.9
NW07505	36.9	73.8	58.0	94.1	53.7	72.8	61.2	**64.4**	**12**	60.5	32.9	148.1	92	4.9
NW09627	33.3	68.3	48.7	76.2	47.3	72.1	68.6	**59.2**	**46**	60.5	31.3	147.2	97	5.4
NW11511	29.3	69.6	51.3	85.6	58.0	68.2	71.7	**62.0**	**26**	59.5	30.8	149.2	88	5.7
NI12702W	30.2	73.0	58.6	84.0	57.0	68.3	67.1	**62.6**	**23**	62.6	32.1	148.4	91	3.8
NI12709	31.2	77.0	57.6	89.5	56.3	70.3	60.1	**63.1**	**17**	61.7	31.6	147.8	100	5.0
NI13703	30.3	67.6	48.3	92.3	54.9	64.1	55.7	**59.0**	**48**	62.2	31.2	146.1	95	5.7
NI13706	36.9	75.1	56.3	97.3	55.0	81.3	64.9	**66.7**	**2**	61.5	30.5	147.6	100	6.2
NI13708	32.8	67.6	50.6	88.4	57.1	69.6	54.3	**60.1**	**38**	61.5	29.1	147.8	100	6.8
Camelot	35.3	75.7	58.7	83.6	51.6	76.5	68.1	**64.2**	**13**	61.1	34.5	149.9	97	4.4
NI04421	28.3	69.4	56.2	95.4	59.6	78.5	58.3	**63.7**	**15**	60.8	32.2	148.8	98	5.8
Settler CL	25.9	69.3	46.6	90.0	57.9	70.5	54.8	**59.3**	**45**	61.4	30.9	148.8	100	5.8
NI13717	24.8	70.6	47.9	84.2	56.8	66.9	71.1	**60.3**	**33**	61.0	31.7	148.4	95	5.9
NI13720	34.2	70.8	55.5	87.9	56.9	65.0	64.2	**62.1**	**25**	60.9	28.3	148.2	100	5.5
NE12408	32.4	69.0	55.6	62.3	53.2	71.5	51.8	**56.5**	**56**	60.0	30.7	147.9	97	5.6
NE12409	26.7	58.4	39.1	76.3	47.1	61.9	58.8	**52.6**	**58**	60.8	29.9	148.8	83	5.4
NE12429	32.0	73.0	58.2	89.2	59.3	75.8	63.5	**64.4**	**11**	61.6	31.1	148.9	100	4.8
NE12430	29.3	74.0	49.4	76.6	53.6	69.1	59.7	**58.8**	**51**	61.2	30.8	148.2	89	6.4
NE12438	37.9	72.4	57.1	87.1	58.2	76.0	62.8	**64.5**	**10**	61.0	33.1	147.7	98	3.8
NE12439	40.6	72.0	57.2	83.6	58.2	75.7	69.7	**65.3**	**5**	60.7	31.7	147.0	90	3.5
NE12443	29.9	71.6	56.0	67.1	54.4	71.7	70.6	**60.2**	**35**	60.6	33.6	147.9	100	3.6
NE12444	24.7	60.1	51.0	82.0	48.0	76.7	71.8	**59.2**	**47**	62.3	31.8	148.1	97	5.3
NE12461	25.4	70.2	49.9	89.0	54.5	69.4	56.8	**59.3**	**44**	60.7	30.7	148.5	95	4.7
NE12464	21.9	68.3	47.0	81.0	59.5	74.8	68.6	**60.2**	**36**	60.4	31.6	148.0	95	5.7
NE12483V	33.2	71.4	45.3	83.3	45.5	68.9	61.5	**58.4**	**52**	61.1	30.6	147.7	95	5.6
NE12488	30.2	69.2	52.2	85.2	57.4	72.9	71.2	**62.6**	**21**	61.7	32.2	147.8	100	5.2
NE12510	22.9	73.9	59.2	81.8	30.5	55.2	51.9	**53.6**	**57**	54.4	30.0	149.0	95	4.5
NE12518	19.7	73.6	56.3	72.7	48.3	69.2	62.5	**57.5**	**54**	60.2	34.6	148.3	98	5.5
NE12524	31.3	71.2	42.5	81.2	41.5	68.6	66.1	**57.5**	**53**	60.7	31.4	149.0	100	6.7
NE12561	31.8	79.2	54.1	87.3	57.6	74.3	63.5	**64.0**	**14**	62.1	31.0	150.2	98	6.2
NE12571	26.8	75.2	57.4	95.4	48.6	72.2	63.7	**62.8**	**19**	61.3	33.5	148.5	93	5.4
NE12580	27.4	67.6	46.6	90.0	47.1	67.3	52.1	**56.9**	**55**	61.7	30.9	150.9	95	6.2
NE12589	35.3	76.7	59.0	86.6	52.5	70.4	71.5	**64.6**	**9**	61.7	31.9	149.1	94	3.5
NE12630	38.5	69.5	55.4	76.8	48.2	70.9	68.3	**61.1**	**31**	60.4	32.7	147.9	98	4.5
NE12637	27.4	67.6	60.4	84.8	54.5	72.9	70.2	**62.5**	**24**	61.3	31.7	150.4	97	2.7
NE12662	37.4	72.4	56.5	78.7	44.2	64.9	61.2	**59.3**	**43**	61.7	32.9	147.7	97	4.8
NE12686	23.9	70.2	56.9	99.6	53.4	68.7	67.3	**62.9**	**18**	60.9	30.2	148.1	95	5.9
NE05548	30.3	68.9	54.6	82.4	52.7	75.3	65.3	**61.4**	**28**	61.1	36.1	148.5	100	5.9
GOODSTREAK	39.1	74.8	50.5	84.9	46.6	73.3	60.0	**61.3**	**29**	60.4	37.3	148.1	100	3.7
SCOUT66	32.0	57.3	36.5	67.3	40.4	60.1	37.1	**47.2**	**60**	60.6	38.0	148.2	100	5.9
CHEYENNE	25.8	52.2	42.1	70.0	44.9	54.6	47.5	**48.2**	**59**	59.9	37.6	131.8	100	4.3
Mean	30.9	71.3	53.5	84.2	53.1	70.5	62.6	**60.9**		**60.8**	**32.1**	**148.0**	**96.5**	**5.1**
LSD	7.8	7.4	6.8	10.5	10.0	7.4	9.6	**8.5**						
CV	15.5	7.5	7.9	6.1	11.6	6.5	9.5	**9.2**						

In 2014 NIN advance wheat, fifty wheat cultivars were analyzed for kernel characteristics, milling attributes, ash and protein contents, dough rheological and bread making properties.

There were significant differences in kernel characteristics among these cultivars. The kernel hardness

indexes were 62.5±7.3. 66% cultivars had high hardness (60.0-80.0) including checks Overland, Settle CL, and Scout 66, 30% cultivars had low hardness (< 60.0) including checks Wesley, Goodstreak and Cheyenne, and other cultivars had very high hardness (≥ 80.0). The kernel diameters and weights were 2.7±0.1 mm and 32.8±1.8 mg, respectively. All cultivars including all checks had large diameter (≥ 2.4 mm). 98% cultivars including all checks had big weight (≥ 30.0 mg).

There were significant differences in milling properties among these cultivars. The flour, bran and short yields were 72.7±1.4 %, 24.5±1.2%, and 2.8±0.5%, respectively. Except of NW11511, all cultivars including all checks produced high flour yield (≥ 68.0%). The bran, short and milling scores were 3.4±0.7, 3.1±0.7, and 3.4±1.2, respectively. Most cultivars including all checks gave fair or better bran cleaning and milling performance.

There were significant differences in ash contents among these cultivars. The ash contents of white flour at 14% mb were 0.37±0.04%. All cultivars including all checks had low ash content (< 0.50%). There were significant differences in protein contents among these cultivars. The protein contents of whole wheat at 12% mb were 13.7±0.6%. All cultivars including all checks had high protein contents of whole wheat (≥ 12.0%). The protein contents of white flour at 14% mb were 12.6±1.0%. After milling, protein contents were lost 0.3±0.6%. All cultivars including all checks had high protein contents of white flour (≥ 10.0%). The protein contents significantly effected on dough rheological properties and breadmaking performance.

There were significantly differences in dough rheology among these cultivars. The flour water absorptions (abs) at 14% mb were 65.5±1.9%. Except of NW11511 and NE05548, all other cultivars including checks had high water abs (≥ 62.0%). The peak times (PT), which indicated dough extensibility, were 4.94±1.43 min. 72% cultivars, including checks Overland and Goodstreak, obtained good dough extensibility (PT 3.0-6.0 min), 6% cultivars (NI04421, Scout 66, and NE13434) obtained small dough extensibility (PT < 3.0 min), and the rest of cultivars obtained very large dough extensibility (PT ≥ 6.0 min), including Settler CL. The peak torques (PQ), which were dough maximum strengths, were 52.3±4.1 %TQ. 72% cultivars, including checks Wesley and Scoutt6, gave good dough strengths (PQ 45.0-55.0 %TQ), 4% cultivars (NE06545 and Settler CL) gave weak dough strengths (PQ < 45.0 %TQ), and the remaining cultivars gave very strong dough strength, including checks Wesley, Scott 66 and Cheyenne. The mixing tolerance rate (TR) were 3.8±0.8. The total areas (TA) in 8 min were 142±21 %TQ·min. Both TR and TA indicated dough resistances in mixing. Except NI04421 got low dough resistance in mixing (TA < 100 %TQ.min), all cultivars include checks got good dough resistance in mixing (TA 100 -200 %TQ·min). 84% cultivars got fair or better than fair tolerance score.

There were significant differences in breadmaking performance among these cultivars. The baking water abs at 14% mb were 63.6±0.9%. Except of NW11511 and SCOUT66, all other cultivars including other checks got high water abs (≥ 62.0%). The mixing times (MT) were 5.25±1.46 min. 74% cultivars, including checks Wesley, Overland, Goodstreak, Scott 66 and Cheyenne, gave normal MT (3.0-6.0 min), and the other cultivars including checks Settler CL gave very long MT (≥ 6.0 min). The dough handling rates were 4.0±0.2 and proof times were 53.5±5.2 min. The weight losses were 19.9±0.7%. The loaf volumes and specific volumes were 939±30 cc and 6.76±0.30 cc/g, respectively. The slice areas were 117±3 cm^2. Except for NW11511, all other cultivars including checks got volumes ≥ 850 cc or specific volumes ≥ 6.12 cc/g. After stored overnight, the breadcrumb firmness was 3017±390 Pa. The crumb brightness was 151±8. The cell numbers were 6835±275. The cell diameters were 2.08±0.12 mm. The non-uniformity was 8.04±35.51. The cell elongation was 149±0.02. The overall bread rates were 4.4±0.4. All cultivars including checks got fair or better than fair bread quality.

The data for 2013 are:

	Mead	Lincoln	C Center	McCook	Alliance	Average	Rank	Hutcheson	NE+KS Avg	Rank	Avg. L and CC	Average
								KS			Test Wt	Height
name	Bu/a	Bu/a	Bu/a	Bu/a	Bu/a	Bu/a		Bu/a			lbs/bu	(in)
WESLEY	70.0	66.6	73.3	43.1	56.5	61.9	46	61.7	61.9	47	56.95	39.2
OVERLAND	71.0	73.7	73.8	39.6	59.8	63.6	31	73.9	65.1	18	58.9	42.4
NE01481	70.6	71.1	67.4	38.9	49.8	59.6	53	66.0	60.5	51	57.75	42.7
NE06430	72.8	76.8	73.1	44.5	56.0	64.6	20	67.4	65.0	20	58.7	42.1
NE06545	80.6	82.4	72.4	40.6	61.2	67.4	5	64.3	67.0	6	56.4	40.9
NE06607	76.5	74.8	76.7	46.6	58.6	66.6	7	64.0	66.3	10	58.45	41.1
NE07486	75.9	72.8	79.6	46.7	52.8	65.6	14	71.9	66.5	7	59.4	41.5
NE07531	77.8	77.5	83.3	43.4	60.4	68.5	3	68.9	68.5	2	58.7	41.6
NE08499	76.5	77.4	74.5	44.5	57.6	66.1	10	57.8	64.9	22	59.45	42.5
NE08659	59.5	60.3	71.7	32.2	54.5	55.6	57	66.5	57.2	57	57.6	42.4
NE09517	73.4	73.1	82.4	39.6	60.7	65.8	11	64.3	65.6	14	60	43.3
NE09521	75.4	70.8	77.5	36.1	62.5	64.5	22	65.6	64.6	23	58.05	42.0
NE10418	70.7	72.1	71.4	40.2	55.2	61.9	44	67.2	62.7	42	59.45	43.8
NE10442	79.8	77.4	66.8	39.1	58.6	64.3	23	61.7	64.0	29	60.25	42.2
NE10478	74.3	77.9	81.3	45.7	56.5	67.1	6	69.8	67.5	4	60.9	40.3
NE10507	79.2	82.2	73.7	41.8	55.5	66.5	8	65.7	66.4	9	56.95	41.5
NE10589	79.8	80.4	71.4	46.6	68.5	69.3	1	65.2	68.7	1	59.1	41.6
NE10625	73.4	71.7	71.3	40.3	61.8	63.7	30	57.8	62.9	39	58.75	41.6
NI04421	69.2	71.1	67.5	53.0	55.6	63.3	35	67.1	63.8	30	58.1	41.4
NE05496	66.1	67.5	78	54.0	54.8	64.1	24	66.6	64.4	24	57.85	42.1
NE10683	78.9	84.0	77.2	40.5	58.0	67.7	4	70.0	68.0	3	57.1	41.6
NE11415	71.2	76.9	74.7	41.8	55.0	63.9	27	65.6	64.2	26	59.5	40.5
NE11455	69.5	77.2	73.1	37.6	55.8	62.6	39	65.2	63.0	37	60.35	42.2
NE11472	74.2	76.6	73.3	44.4	55.9	64.9	18	67.1	65.2	15	59.65	41.8
NE11482	74.7	76.5	74.3	44.6	57.3	65.5	17	62.9	65.1	17	58.85	43.1
NE11499	73.4	72.7	71.3	49.0	49.8	63.2	36	65.3	63.5	31	60.2	39.9
NE11536	73.8	60.6	74.6	43.6	58.2	62.2	43	66.0	62.7	41	58.35	40.8
NE11560	75.6	80.8	74.3	31.1	57.5	63.9	28	60.8	63.4	34	58.05	40.5
NE11607	73.2	72.1	61.4	45.7	57.1	61.9	45	64.8	62.3	43	54.5	42.7
Camelot	71.3	65.9	76.9	46.5	61.8	64.5	21	68.4	65.0	19	58.45	42.7
NH10665	76.6	70.0	71.6	43.4	56.0	63.5	33	61.1	63.2	36	59.3	43.6
NH11489	72.2	77.6	73.9	44.2	59.6	65.5	16	71.6	66.4	8	59.15	41.3
NH11490	74.7	81.7	74.1	49.6	62.6	68.5	2	61.1	67.5	5	60.95	40.8
NH11563	77.0	73.7	73.6	35.9	58.6	63.8	29	66.3	64.1	27	59.05	43.8
NH11565	76.2	74.8	76.8	31.3	53.0	62.4	41	66.5	63.0	38	59.25	39.7
NH11668	64.7	69.0	72.9	37.6	56.7	60.2	52	58.9	60.0	52	59.2	42.0
NHH09655	67.6	65.3	71.7	32.9	50.0	57.5	56	57.3	57.5	56	55.7	39.9
NHH11569	68.6	68.7	74.6	46.6	53.9	62.5	40	59.8	62.1	44	59.5	43.3
NHH11638	78.0	78.9	70.9	48.4	51.4	65.5	15	68.2	65.9	11	60.15	42.9
Settler CL	67.9	68.0	72.7	52.4	56.0	63.4	34	69.2	64.2	25	58.7	41.0
NI04420	77.7	76.7	75.2	40.4	58.5	65.7	12	60.3	64.9	21	59.7	42.0
NI07703	73.7	65.8	71.6	42.4	59.9	62.7	37	63.8	62.8	40	57.9	41.5
NI08708	70.3	69.0	74.5	41.4	62.6	63.6	32	60.9	63.2	35	57	41.0
NI09710H	71.9	69.1	76.8	42.9	67.8	65.7	12	66.9	65.9	12	55.25	40.2
NI10712	66.2	63.3	68	36.2	59.8	58.7	54	61.2	59.1	55	55	41.5
NI10718W	72.0	67.6	70	38.0	54.6	60.4	50	62.1	60.7	50	57.15	41.4
NI12702W	73.7	73.0	72.2	44.7	60.3	64.8	19	59.7	64.1	28	59.85	42.4
NW03666	75.0	67.2	80.8	50.8	57.8	66.3	9	61.6	65.6	13	58.8	42.3
NW07505	71.0	70.1	75.1	42.0	61.9	64.0	26	60.4	63.5	32	57.6	42.6
NW09627	57.1	62.4	77.8	45.5	64.5	61.5	47	60.3	61.3	48	57	40.3
NW10487	53.0	54.9	67.7	41.7	59.1	55.3	58	61.0	56.1	58	55.55	42.0
NW11510	72.7	76.9	62.6	40.0	53.4	61.1	48	67.1	62.0	46	59.05	41.6
NW11511	78.5	73.6	64.3	46.6	57.2	64.0	25	71.6	65.1	16	57.55	40.5
NW11590	70.0	68.9	67.5	40.4	54.9	60.3	51	54.2	59.5	53	58.65	42.0
NW11598	69.1	74.4	72.6	40.4	56.9	62.7	37	68.1	63.5	33	58.7	41.0
NE05548	68.0	66.6	72.1	38.4	59.9	61.0	49	59.8	60.8	49	57.95	44.8
NE11688	76.2	78.3	64.6	38.4	54.4	62.4	42	60.3	62.1	45	55.95	42.1
GOODSTREAK	64.2	59.6	66.5	40.4	62.2	58.6	55	64.7	59.5	54	58.7	43.8
SCOUT66	51.2	47.7	60	37.9	51.0	49.6	59	52.0	49.9	59	58	44.4
CHEYENNE	41.1	39.1	56	40.0	44.3	44.1	60	53.4	45.4	60	57.85	47.1
GRAND MEAN	**71.4**	**71.22**	**72.45**	**42.21**	**57.37**	**62.932**		**63.99**				
LSD	8.54	6.42	8.79	11.27	8.38			7.2				
CV	**7.37**	**6.45**	**7.5**	**13.17**	**7.55**			**6.93**				
Heritability	**0.99**	**0.99**	**0.72**	**0.98**	**0.98**			**0.98**				

The 2012 data are presented below:

name	Kansas	Mead	Linc.	Clay Cen.	N. Platte	McCook	Sidney	Heming.	Avg.	NE Avg.	Rank	NE Rank
	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a
WESLEY	56.2	66.3	50.1	42.4	42.1	71.9	62.3	26.5	52.23	51.66	38	41
Overland	61.9	78.6	57.6	63.3	47.0	76.6	66.4	22.4	59.23	58.84	7	6
NE05496	62.4	57.6	50.0	48.6	38.6	77.3	69.9	25.3	53.71	52.47	29	36
NE05548	41.1	60.0	47.6	50.5	36.7	59.4	63.0	23.6	47.74	48.69	55	54
NE06430	59.8	63.0	49.6	51.6	45.1	79.3	65.6	25.5	54.94	54.24	21	23
NE06545	62.1	72.0	59.8	64.5	54.2	82.0	60.5	26.6	60.21	59.94	5	3
NE06607	57.5	65.8	51.9	54.4	44.0	75.4	60.0	25.2	54.28	53.81	25	26
NE07486	79.0	67.0	51.3	60.8	52.1	79.8	67.3	24.7	60.25	57.57	4	11
NE07531	55.7	60.6	50.7	51.7	42.2	79.9	60.5	26.1	53.43	53.10	32	30
NE07627	45.4	66.9	51.0	54.4	44.2	69.9	61.9	25.5	52.40	53.40	36	28
NE08457	55.2	57.4	50.5	49.2	40.6	58.3	49.9	24.4	48.19	47.19	53	56
NE08476	50.3	62.9	51.7	61.5	38.5	54.7	61.9	23.7	50.65	50.70	45	45
NE08499	61.1	66.7	51.3	54.4	46.8	75.3	66.7	26.4	56.09	55.37	15	14
NE08527	49.7	68.5	54.7	55.1	32.9	62.0	52.2	25.3	50.05	50.10	48	48
NE08555	63.6	62.3	50.4	59.2	42.8	65.9	56.2	26.6	53.38	51.91	33	38
NE08659	41.1	64.2	55.1	60.1	27.4	64.2	61.5	25.1	49.84	51.09	49	43
NE09491	49.6	64.6	45.2	53.4	37.9	65.4	59.3	26.5	50.24	50.33	47	46
NE09495	28.2	69.3	56.0	26.3	47.0	73.6	61.6	21.7	47.96	50.79	54	44
NE09499	53.2	64.2	55.0	43.7	36.7	67.4	59.2	23.3	50.34	49.93	46	50
NE01481	51.7	78.9	63.0	57.1	47.7	73.4	63.2	25.0	57.50	58.33	11	9
NE09517	67.0	63.3	49.2	64.6	50.5	74.9	46.7	25.8	55.25	53.57	20	27
NE09521	61.6	73.8	51.0	61.4	54.8	75.5	65.1	27.2	58.80	58.40	9	8
NE09637	34.9	62.8	52.4	39.3	29.3	68.3	53.3	25.4	45.71	47.26	58	55
NE10418	60.8	62.1	43.5	50.5	47.7	75.9	63.9	24.4	53.60	52.57	31	34
NE10431	54.5	65.4	54.4	55.5	46.0	79.2	58.1	25.2	54.79	54.83	22	18
NE10442	72.2	60.6	42.2	55.8	48.6	79.5	58.2	25.3	55.30	52.89	19	32
NE10449	46.2	60.8	53.3	56.9	34.1	61.6	53.8	24.2	48.86	49.24	51	52
NE10478	81.6	67.9	48.4	61.1	51.7	87.2	65.8	30.7	61.80	58.97	1	5
NE10507	67.3	72.5	62.1	71.3	49.1	81.5	62.7	25.8	61.54	60.71	3	2
NI04421	59.6	68.8	59.3	64.4	54.9	76.7	64.9	26.0	59.33	59.29	6	4
Camelot	48.0	58.8	47.4	50.4	40.8	61.7	62.4	23.3	49.10	49.26	50	51
NE10509	44.9	71.1	63.6	49.8	42.6	66.9	62.9	28.3	53.76	55.03	28	16
NE10514	49.0	61.9	47.9	57.8	42.8	72.2	59.2	30.8	52.70	53.23	35	29
NE10517	56.6	67.6	44.6	54.8	41.1	63.3	58.1	28.1	51.78	51.09	42	42
NE10522	46.3	58.4	41.0	48.3	42.9	64.3	61.2	27.1	48.69	49.03	52	53
NE10529	50.4	75.2	60.6	64.6	48.3	65.8	61.2	27.9	56.75	57.66	13	10
NE10559	60.6	61.8	43.5	51.5	41.2	63.4	64.7	26.0	51.59	50.30	43	47
NE10589	59.0	74.4	64.8	71.0	53.4	81.0	61.9	27.7	61.65	62.03	2	1
NE10609	40.0	58.4	56.8	52.6	39.7	74.7	58.1	26.6	50.86	52.41	44	37
Settler CL	70.5	64.9	52.1	45.4	45.5	81.6	69.9	24.9	56.85	54.90	12	17
NE10625	49.7	72.2	45.1	52.0	44.5	77.5	65.3	26.4	54.09	54.71	27	21
NE10628	53.7	65.4	49.7	56.0	45.3	64.6	57.9	23.5	52.01	51.77	40	40
NE10638	54.1	54.7	43.9	50.4	37.2	52.1	53.9	23.8	46.26	45.14	57	58
NE10683	50.4	59.8	66.0	58.2	42.5	74.3	58.8	24.0	54.25	54.80	26	19
NH09563	58.2	62.1	47.6	56.9	45.2	76.6	65.2	26.0	54.73	54.23	23	25
NH10665	61.3	69.9	55.1	68.5	51.0	70.9	70.0	24.6	58.91	58.57	8	7
NHH09655	57.1	62.2	50.8	54.7	50.1	69.7	65.7	26.5	54.60	54.24	24	24
NI04420	65.7	66.9	49.1	61.8	51.0	75.9	63.2	31.1	58.09	57.00	10	12
NI08708	63.1	59.2	46.6	52.2	44.9	75.0	60.2	25.3	53.31	51.91	34	39
NI09706	51.6	51.1	42.7	37.4	34.7	74.6	58.4	25.0	46.94	46.27	56	57
NI09709	69.7	62.3	47.8	55.6	47.6	72.4	69.5	28.2	56.64	54.77	14	20
NI09714W	66.3	64.1	53.1	67.0	46.3	62.4	61.1	26.2	55.81	54.31	17	22
NW03666	58.1	64.9	49.2	55.6	37.4	74.2	65.6	24.0	53.63	52.99	30	31
NW07505	55.3	71.0	54.3	61.4	39.1	72.1	62.5	27.8	55.44	55.46	18	13
NW09627	65.7	51.0	45.7	51.0	40.9	70.5	62.5	27.9	51.90	49.93	41	49
NW10401	60.4	70.1	50.7	59.1	43.4	73.8	64.7	25.2	55.93	55.29	16	15
NW10487	48.8	65.2	51.4	49.3	39.2	73.7	62.5	27.0	52.14	52.61	39	33
GOODSTREAK	43.9	50.6	46.6	45.3	38.1	47.8	53.0	24.5	43.73	43.70	59	59
SCOUT66	43.5	38.8	31.2	33.3	32.4	56.2	49.5	19.6	38.06	37.29	60	60
CHEYENNE	50.6	59.0	54.4	53.1	42.1	73.1	58.4	27.5	52.28	52.51	37	35
GRAND MEAN	**55.71**	**64.12**	**51.2**	**54.46**	**43.38**	**70.9**	**61.15**	**25.73**	**53.33**	**52.99**		

Data from 2012 to 2014 (three year average) from the Nebraska Intrastate Nursery for Grain Yield (bu/a) are presented below:

2012-	Mead	Linc.	C. Center	N. Platte	Sidney	Alliance	McCook	**NE Avg.**	
2014	Yield	Yield	Yield	Yield	Yield	Yield	Yield	**Yield**	**Rank**
Name	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	**(bu/a)**	
Camelot	55.1	63.0	61.0	46.2	69.5	51.1	63.9	59.1	**18**
CHEYENN	42.0	48.6	50.7	43.5	56.5	39.8	61.0	48.3	**25**
GOODSTR	51.3	60.3	54.3	42.4	63.2	48.9	57.7	54.6	**24**
NE01481	58.7	67.5	58.4	52.1	68.5	41.8	66.5	59.0	**20**
NE05548	52.8	61.0	59.2	44.7	69.2	49.6	60.1	57.0	**22**
NE06430	55.7	66.2	58.1	49.9	64.8	47.0	68.8	59.4	**17**
Freeman	61.2	71.6	64.5	52.9	67.5	53.3	64.4	62.9	**3**
NE07486	58.7	66.0	62.8	50.8	68.9	46.8	69.3	61.0	**13**
NE07531	55.4	67.6	62.8	47.2	66.5	51.8	68.3	61.1	**12**
NE08499	59.3	67.1	62.6	46.1	66.8	48.4	66.7	60.5	**14**
NE09517	56.7	65.0	69.5	52.7	63.1	51.3	66.9	61.5	**9**
NE09521	60.4	63.7	65.2	55.0	68.2	49.2	64.0	61.1	**11**
NE10478	57.7	68.5	64.1	53.0	64.2	47.9	73.5	62.0	**6**
NE10507	61.9	73.5	66.0	53.0	70.0	44.7	70.4	63.2	**2**
NE10589	60.1	74.4	68.0	54.0	69.8	56.0	71.1	65.4	**1**
NE10683	58.1	74.4	64.7	51.5	65.9	48.0	68.9	62.5	**4**
NI04420	59.2	65.7	62.3	52.4	68.8	53.3	66.4	61.6	**8**
Robidoux	55.4	66.6	62.7	57.3	71.7	46.6	75.0	62.1	**5**
NW03666	57.5	61.4	65.3	45.3	67.7	45.2	70.4	60.0	**15**
NW07505	59.6	66.1	65.6	46.4	67.7	50.3	69.4	61.4	**10**
NW09627	47.1	58.8	58.7	44.1	67.3	53.7	64.1	56.8	**23**
Overland	61.2	67.7	65.4	52.0	68.6	50.2	66.3	61.9	**7**
SCOUT66	40.7	45.4	43.6	36.4	54.8	35.9	53.8	44.8	**26**
Settler CL	52.9	63.1	56.0	51.7	70.2	45.2	74.7	59.4	**16**
WESLEY	54.0	62.2	54.3	50.2	59.3	50.0	67.5	57.4	**21**
Mean	**55.7**	**64.6**	**61.0**	**49.2**	**66.3**	**48.2**	**66.8**	**59.4**	

As can be seen from the excellent three-year yields of released lines (Robidoux, Freeman, Settler CL, and Overland) our released lines continue to do well, but we have many experimental lines with excellent grain yields in the east, central, or west parts of Nebraska. Of particular note are the NE10 lines (NE10589, NE10507, ND10683) which continue to do well in our and the State Variety Trials. As expected Cheyenne and Scout 66 were the lowest yielding lines, but again it was surprising that scout66 was lower yielding than Cheyenne. Both broadly and more narrowly adapted lines have value in wheat production.

5. <u>Nebraska Triplicate Nursery (NTN):</u>

The same comments about the NIN data apply to the NTN. Again Mead was low yielding due to disease and McCook had excellent yields with the remaining location being normal to good. In this nursery, Camelot and Goodstreak performed well, bur Freeman was mediocre compared to the experimental lines. Camelot did particularly well. There are a number of lines that have promise for continued testing toward new cultivar releases. The lines in the NTN have less performance history, so it is expected that some experimental lines will out-yield the checks, but most lines will have poorer performance. As in the NIN, there were low but positive correlations among the locations (the best being Clay Center and Sidney). The variation in one location could explain at most 38% of the variation in the other location. However, most locations explained less than 10% of the variation at the other locations. This result again indicated the value of extensive testing in NE.

The data for the 2014 TRP:

2014	Mead	Linc	Ccenter	Nplatte	McCook	Sidney	Alliance	Average	rank	Average	Average	Average
	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Hdate	Hegith	Testwt
name	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	Julian	(in)	lbs/bu
Camelot	37.9	75.4	59.9	38.4	90.2	73.5	62.9	62.6	11	149.12	35.19	61.70
Freeman	28.2	70.2	52.6	48.5	82.0	63.4	67.4	58.9	39	148.15	32.31	61.85
GOODSTREAK	39.3	74.4	53.5	41.0	85.4	74.8	58.3	61.0	21	148.98	40.37	61.90
NE13402	23.8	63.4	40.5	47.8	78.5	56.5	59.4	52.8	58	146.15	28.49	61.20
NE13405	37.7	75.9	64.6	40.1	91.1	75.2	64.1	64.1	4	147.18	32.56	62.60
NE13412	31.8	56.8	42.1	35.0	81.9	61.3	52.4	51.6	59	147.84	34.34	62.03
NE13420	31.3	68.8	52.7	36.5	77.6	65.3	53.6	55.1	53	148.25	33.91	62.55
NE13425	38.3	71.1	61.1	41.9	81.9	67.9	65.5	61.1	19	147.54	32.56	62.38
NE13430	28.2	67.0	54.3	47.1	74.1	66.3	58.6	56.5	50	148.04	35.74	62.08
NE13434	54.1	74.5	64.1	46.9	85.9	74.7	63.1	66.2	1	148.86	33.69	62.03
NE13438	23.9	65.1	59.3	39.1	88.5	72.8	65.8	59.2	35	148.84	30.54	62.83
NE13443	7.2	45.5	40.9	40.1	76.4	60.5	57.9	46.9	60	149.20	29.39	61.85
NE13445	39.0	69.4	61.1	41.9	76.8	78.9	63.6	61.5	16	148.02	35.91	62.08
NW13455	46.5	68.6	62.0	41.7	89.8	74.9	59.3	63.3	8	148.84	34.09	62.30
NW13457	30.4	66.4	55.7	43.6	72.1	77.4	67.6	59.0	38	148.49	34.16	62.85
NW13458	24.4	62.1	53.2	40.9	82.2	71.7	49.6	54.9	55	149.26	34.51	64.30
NE13471	25.5	67.1	50.7	38.3	81.2	56.5	59.0	54.0	57	148.28	33.71	60.95
NW13480	28.6	64.0	53.4	42.9	78.9	68.4	66.6	57.5	47	149.95	31.83	60.30
NE13482	26.5	69.8	57.2	42.2	87.2	64.7	64.2	58.8	40	149.65	34.13	60.60
NE13483V	28.1	62.8	57.5	44.5	88.1	81.1	61.2	60.5	26	149.93	35.00	63.60
NE13484V	24.5	67.0	56.6	39.4	82.0	66.0	50.1	55.1	54	148.97	33.01	61.23
NW13491	20.1	63.7	52.4	50.1	94.5	60.7	55.8	56.8	48	149.86	31.07	62.58
NW13493	31.5	70.9	64.8	47.7	93.9	77.2	57.1	63.3	7	149.63	32.50	62.50
NW13494	32.6	64.2	60.5	44.1	90.9	69.4	60.0	60.2	27	148.98	32.64	62.90
NW13499	31.8	69.0	60.0	38.5	83.9	78.4	51.8	59.1	37	149.51	37.23	62.00
NW13502	34.9	77.2	59.5	40.5	90.1	75.3	60.2	62.5	12	149.40	33.90	62.08
NE13510	39.2	66.3	54.0	37.9	81.0	67.6	50.7	56.7	49	148.84	31.03	61.00
NE13511	26.8	74.2	61.5	51.1	87.9	78.3	59.8	62.8	10	150.02	32.64	62.33
NE13515	31.3	71.3	56.6	33.4	97.0	73.3	67.3	61.5	17	149.00	34.14	62.28
NW13516	27.4	67.7	56.6	43.9	74.7	79.2	71.0	60.1	29	149.65	32.61	60.68
NW13518	30.4	65.6	54.1	45.0	80.0	71.0	61.2	58.2	44	149.80	32.19	60.25
NW13535	29.8	67.9	55.5	42.1	82.8	65.3	49.3	56.1	51	149.47	32.64	62.18
NW13536	32.9	66.3	63.0	41.9	82.6	68.0	58.8	59.1	36	149.33	29.86	62.55
NW13542	42.3	69.6	57.9	42.3	82.4	72.9	52.6	60.0	30	149.77	35.24	62.98
NE13544	39.1	62.4	61.2	49.9	81.6	75.0	47.3	59.5	34	149.67	32.91	62.20
NE13545	23.2	75.3	64.2	43.1	80.6	75.0	55.5	59.6	33	150.16	35.16	62.48
NE13546	35.6	70.3	56.9	38.1	59.6	62.4	59.6	54.6	56	148.97	34.87	60.58
NE13550	30.8	75.4	53.9	44.8	79.3	78.6	56.3	59.9	31	148.13	32.91	62.60
NE13554	23.4	71.5	62.2	51.7	84.8	81.4	66.1	63.0	9	151.63	35.73	62.40
NW13560	36.4	68.1	56.4	42.1	78.0	74.8	70.2	60.9	23	150.40	32.84	60.33
NE13564	24.2	66.7	55.5	39.6	74.6	68.2	60.0	55.5	52	149.16	32.91	62.08
NW13570	37.4	66.5	57.2	48.7	95.6	79.0	53.0	62.5	13	150.00	32.46	61.28
NW13574	33.7	73.6	61.3	41.2	75.8	79.0	67.8	61.8	14	149.65	36.76	62.95
NE13583	31.7	66.7	58.2	39.7	91.4	74.7	61.9	60.6	25	149.63	31.74	61.80
NE13585	32.1	67.7	57.3	39.8	81.5	70.3	61.2	58.6	42	148.80	31.73	60.53
NE13589	33.0	73.2	56.0	42.0	70.6	77.2	66.9	59.8	32	149.70	34.87	62.38
NE13593	31.8	68.7	58.2	43.4	93.2	73.3	60.0	61.2	18	149.40	34.77	62.38
NW13596	33.3	74.2	58.4	41.5	78.8	75.5	58.9	60.1	28	150.07	34.61	60.05
NE13597	25.4	63.7	54.0	52.3	92.9	69.6	69.2	61.0	20	150.02	31.30	61.73
NE13604	25.5	74.2	62.3	49.1	89.5	84.5	72.6	65.4	2	150.85	35.40	62.33
NE13624	32.1	60.4	66.0	43.8	65.3	72.7	64.9	57.9	45	149.36	33.71	62.10
NE13625	51.2	82.2	70.0	40.1	83.0	77.0	53.4	65.3	3	147.70	33.44	62.80
NE13629	22.2	70.2	62.0	30.4	78.5	77.0	64.5	57.8	46	151.08	36.16	61.63
NW13647	18.1	60.8	57.6	49.0	88.0	75.9	61.6	58.7	41	150.22	33.00	63.78
NE13660	24.1	64.5	63.7	47.5	90.3	73.7	62.8	60.9	22	150.63	32.86	62.38
NW13669	28.0	67.8	57.9	54.3	89.8	85.1	64.1	63.9	5	151.03	34.70	61.88
NE13672	34.5	68.9	55.3	47.5	101.5	81.2	56.0	63.6	6	149.34	33.23	60.05
NE13681	25.1	68.5	65.1	29.2	81.0	78.5	62.1	58.5	43	149.38	35.24	62.70
NE13683	27.3	71.6	59.4	50.4	86.5	76.3	59.4	61.6	15	149.69	32.34	63.18
NE13687	17.5	56.8	60.2	52.4	94.0	78.2	65.5	60.7	24	152.71	32.96	61.98
Mean	**30.7**	**68.2**	**57.7**	**43.1**	**83.7**	**72.7**	**60.4**	**59.5**		**149.33**	**33.53**	**62.00**
LSD	9.7	9.5	6.9	11.1	12.0	7.3	9.4	9.4				
CV	16.2	7.2	6.2	15.8	5.9	6.2	9.6	9.6				

2013 name	Mead Yield bu/a	Lincoln Yield bu/a	C. Center Yield bu/a	McCook Yield bu/a	Alliance Yield bu/a	NE. Avg. Yield bu/a	Rank	KS Yield bu/a	Rank
NE12406	67.7	71.0	73.2	48.0	51.0	62.18	44	55.2	55
NE12408	71.7	75.1	84.9	54.5	54.5	68.14	10	58.2	48
NE12409	72.9	72.1	76.5	48.5	59.7	65.94	29	60.3	36
NE12416	72.7	66.5	72.3	45.2	53.6	62.06	46	61.5	30
NE12417	75.9	75.9	69.2	48.0	62.9	66.38	24	56.1	54
NE12429	78.4	77.0	73.8	47.5	64.0	68.14	11	60.7	34
NE12430	77.1	77.7	82.2	51.5	64.3	70.56	2	60.1	42
NE12435	65.1	70.3	68.6	43.2	56.9	60.82	51	60.2	39
NE12438	74.4	73.1	86.4	48.5	69.4	70.36	4	65.3	10
NE12439	74.3	77.3	79.1	52.5	64.3	69.50	7	66.4	8
NE12443	78.0	79.0	84.6	47.6	56.6	69.16	8	69.2	2
NE12444	73.2	68.3	76.5	50.0	65.9	66.78	21	58.1	49
NE12450	65.0	87.3	76.1	46.5	63.1	67.60	14	61.9	27
NE12456	60.3	71.2	72.7	41.7	56.7	60.52	55	54.3	56
Camelot	73.0	70.6	78.9	48.9	64.7	67.22	18	60.7	34
NE12459	71.7	72.8	72.4	46.6	57.9	64.28	36	62.4	20
NE12461	76.6	82.1	79.1	47.5	54.9	68.04	12	68.5	4
NE12464	75.9	75.6	81.3	44.9	66.4	68.82	9	64.5	12
NE12467	64.3	74.4	70.9	33.8	56.3	59.94	56	54.0	57
NE12480	62.4	60.8	77.9	34.9	61.6	59.52	59	61.1	32
NE12482	68.6	67.2	70.9	34.9	64.2	61.16	50	62.4	20
NE12483V	70.3	63.2	78.2	49.5	69.6	66.16	26	72.9	1
NE12486	70.5	71.3	63.5	37.6	60.5	60.68	53	61.8	28
NE12488	68.9	78.3	75.7	46.4	60.9	66.04	27	60.2	39
NE12503	70.7	78.2	76.4	44.2	66.5	67.20	19	62.4	20
NE12509	69.7	69.4	70.9	49.6	51.0	62.12	45	62.7	19
NE12510	73.4	76.8	78.2	46.7	53.9	65.80	30	65.1	11
NE12518	75.2	70.1	79.6	51.8	59.6	67.26	17	62.4	20
NE12521	63.5	63.1	77.0	42.9	56.4	60.58	54	51.8	59
GOODSTREAK	72.3	61.6	71.1	47.5	61.9	62.88	42	62.1	25
NE12524	75.8	73.4	77.2	55.3	67.3	69.80	6	57.7	50
NE12538	66.7	69.7	67.2	45.3	54.8	60.74	52	64.4	13
NE12539	63.3	69.0	64.6	40.0	55.4	58.46	60	51.5	60
NE12550	69.8	75.4	75.2	39.8	58.2	63.68	38	67.1	6
NE12561	71.7	76.1	80.1	45.2	62.1	67.04	20	59.7	45
NE12563	69.3	73.5	81.5	42.4	57.4	64.82	35	65.5	9
NE12568	73.6	67.6	65.3	42.3	59.5	61.66	48	61.0	33
NE12571	75.0	75.5	76.1	53.7	53.0	66.66	22	66.9	7
NE12578	75.8	72.1	75.7	43.3	52.1	63.80	37	64.4	13
NE12580	71.8	76.1	79.3	56.1	54.3	67.52	15	62.3	24
NE12582	67.6	73.2	74.0	41.9	56.1	62.56	43	53.9	58
NE12583	64.0	71.2	75.2	44.3	55.5	62.04	47	62.0	26
NE12585	68.9	71.3	78.3	46.3	59.6	64.88	33	58.5	47
NE12589	78.5	77.1	86.4	45.0	62.7	69.94	5	67.5	5
OVERLAND	73.6	78.3	84.4	42.5	53.8	66.52	23	59.9	44

NE12595	64.8	61.6	78.3	36.4	58.2	59.86	58	61.8	28
NE12596	64.1	64.1	72.2	39.3	60.0	59.94	56	58.7	46
NE12598	70.1	72.4	76.5	41.7	55.8	63.30	41	56.2	53
NE12630	67.4	65.7	78.6	52.8	65.3	65.96	28	57.7	50
NE12634	70.9	69.4	77.2	50.6	57.2	65.06	32	60.3	36
NE12637	68.4	74.8	80.1	46.8	57.8	65.58	31	63.9	15
NE12639	62.4	65.8	72.9	45.7	60.0	61.36	49	63.4	16
NE12659	74.8	72.2	75.1	45.8	56.5	64.88	34	60.2	39
NE12662	78.8	78.6	81.9	50.9	62.5	70.54	3	63.1	17
NE12668	72.4	74.5	72.2	49.7	63.0	66.36	25	60.3	36
NE12675	69.2	73.9	72.8	44.0	57.2	63.42	40	57.1	52
NE12685	73.7	70.7	73.1	45.9	55.0	63.68	38	61.5	30
NE12686	73.3	75.4	89.5	57.2	61.6	71.40	1	68.8	3
NE12689	72.7	74.1	80.9	47.3	63.2	67.64	13	60.1	42
NH12615	73.2	70.7	84.0	47.2	61.7	67.36	16	63.0	18
MEAN	**70.92**	**72.35**	**76.39**	**46.09**	**59.43**			61.35	
LSD	**8.18**	**7.48**	**9.19**	**8.38**	**9.18**			**5.98**	
CV	**5.96**	**6.37**	**7.44**	**8.89**	**9.52**			**6.01**	
Heritability	**0.99**	**0.99**	**0.7**	**0.99**	**0.97**			**0.99**	

The data for the 2012 TRP:

2012 name	KS (bu/a)	Mead (bu/a)	Linc. (bu/a)	Clay C. (bu/a)	N. Platte (bu/a)	McCoo (bu/a)	Sid (bu/a)	Allian. (bu/a)	Mean (bu/a)	Rank	Flower date
Camelot	41.3	58.0	48.2	50.7	37.7	63.2	63.7	46.0	51.1	52	**125.7**
GOODSTREAK	36.4	49.4	43.2	39.2	31.7	51.5	57.1	48.8	44.7	60	**125.4**
Overland	47.8	76.6	52.0	64.5	42.7	75.4	65.6	51.6	59.5	6	**129.0**
NE11415	66.9	51.7	41.9	51.9	43.4	82.6	63.1	49.6	56.4	16	**117.7**
NE11423	64.0	53.3	42.1	46.4	39.5	66.4	58.4	45.4	51.9	46	**123.1**
NE11426	45.4	65.2	49.7	51.9	41.9	72.4	57.6	47.1	53.9	30	**117.6**
NE11440	61.2	60.7	39.4	55.2	37.0	64.7	60.8	49.2	53.5	36	**122.0**
NE11443	51.9	59.2	46.2	51.4	38.3	60.1	61.4	38.8	50.9	54	**117.6**
NE11455	64.0	63.5	45.4	46.2	39.4	82.2	65.8	40.9	55.9	20	**119.3**
NE11461	60.9	54.8	52.1	47.8	43.3	66.2	62.9	47.7	54.5	25	**122.0**
NE11464	52.7	55.3	49.5	47.1	38.3	77.9	54.2	45.9	52.6	42	**119.7**
NE11470	58.9	55.2	46.5	55.0	44.5	72.2	63.4	51.2	55.9	21	**117.7**
NE11472	62.1	60.6	50.2	58.6	44.1	78.6	60.4	47.2	57.7	12	**119.7**
NE11480	55.1	56.5	47.4	45.7	39.2	68.7	59.6	43.3	51.9	46	**121.5**
NE11482	48.9	59.3	47.7	53.2	43.7	72.7	66.6	52.2	55.5	22	**126.3**
NH11489	60.4	57.7	50.3	55.4	43.7	88.2	64.8	47.1	58.5	9	**123.1**
NH11490	48.2	63.6	49.1	52.5	41.6	75.2	64.6	44.7	54.9	24	**123.7**
NE11499	62.4	67.5	52.4	54.8	40.8	77.9	65.7	46.1	58.5	8	**121.3**
NW11510	67.0	51.1	38.8	49.7	41.6	85.9	57.6	38.4	53.8	32	**117.7**
NW11511	68.1	53.1	48.1	55.3	50.3	88.8	59.1	41.4	58.0	11	**116.1**
NW11514	57.6	61.7	38.0	50.6	40.3	75.0	62.8	45.2	53.9	31	**119.1**
NE11522	52.6	64.1	44.6	48.3	36.9	63.9	55.0	45.1	51.3	49	**121.6**
NE11527	52.2	64.6	51.5	51.4	40.0	69.0	64.3	47.1	55.0	23	**124.4**
NE11530	45.9	63.7	52.6	50.3	35.8	60.8	56.3	49.3	51.8	48	**124.1**
NE11536	41.2	65.9	49.1	61.0	48.6	69.5	65.2	50.6	56.4	16	**127.7**

NE11543	41.2	61.1	50.1	40.8	38.6	67.9	59.0	50.8	51.2	50	**126.7**
NE11560	69.3	60.8	56.8	59.6	53.5	83.3	70.0	48.4	62.7	1	**120.6**
NH11563	56.6	64.4	52.0	51.4	51.1	77.5	65.9	42.6	57.7	13	**126.0**
NH11565	62.6	63.7	57.9	59.5	44.3	85.8	60.0	51.1	60.6	2	**122.7**
NHH11569	56.3	59.0	45.3	54.3	39.6	63.4	58.2	44.9	52.6	41	**122.4**
NE11581	51.7	61.9	48.2	44.9	39.2	64.1	59.8	53.3	52.9	39	**122.0**
NW11588	34.3	62.1	55.3	52.4	41.4	65.4	60.7	50.4	52.8	40	**126.3**
NW11589	33.0	54.1	48.7	45.7	31.4	53.8	57.4	41.2	45.7	59	**124.7**
NW11590	58.8	67.4	54.7	60.0	48.1	81.9	64.6	48.3	60.5	3	**121.9**
NW11593	49.0	55.5	40.9	47.5	39.4	71.9	59.3	45.9	51.2	51	**119.3**
NW11598	61.2	57.2	53.5	57.4	47.0	78.6	68.6	43.3	58.4	10	**123.7**
NE11607	45.9	75.0	59.9	71.6	46.9	73.4	53.9	51.6	59.8	5	**129.4**
NE11608	40.7	65.7	54.3	51.4	40.5	65.9	56.6	50.0	53.1	38	**129.3**
NE11610	32.1	62.0	51.0	57.1	43.9	67.1	62.7	52.2	53.5	37	**127.7**
NE11612	35.7	59.9	56.0	62.9	43.5	64.6	59.8	46.9	53.7	33	**130.0**
NE11613	39.6	59.3	50.7	60.6	41.4	65.0	59.0	43.5	52.4	43	**125.7**
NH11631	44.5	71.0	58.9	47.9	39.8	84.6	59.2	41.5	55.9	19	**129.3**
NHH11638	34.6	71.3	59.6	54.4	47.9	90.0	57.4	46.1	57.7	14	**127.6**
NHH11639	34.6	65.9	56.7	53.6	44.9	83.2	64.8	43.9	56.0	18	**128.9**
NE11642	37.6	66.1	47.2	52.0	37.0	59.6	56.5	51.5	50.9	53	**130.0**
NE11643	40.0	62.5	47.2	67.3	36.9	59.0	59.0	46.5	52.3	44	**129.6**
NW11645	43.8	63.4	52.5	53.8	33.0	66.3	50.3	53.9	52.1	45	**129.0**
NE11652	45.3	69.1	51.1	59.6	39.9	59.6	60.4	49.6	54.3	26	**129.6**
NE11653	27.3	74.4	56.0	60.1	36.7	67.4	62.6	48.9	54.2	29	**128.7**
NE11654	46.6	68.0	63.1	64.9	43.2	71.9	65.4	51.6	59.3	7	**129.2**
NE11655	31.9	65.2	51.9	47.1	38.3	67.9	55.7	44.8	50.4	55	**129.9**
NH11663	37.1	71.3	56.6	50.5	35.4	73.8	63.1	46.4	54.3	27	**130.6**
NH11664	40.0	75.1	52.6	49.9	38.4	72.7	59.5	40.5	53.6	34	**130.4**
NH11668	41.3	73.6	57.9	52.3	39.4	78.8	61.6	47.4	56.5	15	**129.4**
NE11684	32.1	69.6	55.1	64.1	43.2	67.7	54.2	42.6	53.6	35	**130.9**
NE11688	41.6	73.7	61.9	73.3	49.9	70.1	65.4	46.7	60.3	4	**128.3**
NE11690	27.8	60.2	49.1	43.7	33.9	69.1	59.9	42.2	48.2	58	**128.6**
NH11691	35.1	54.4	54.1	45.8	40.1	79.3	46.1	46.3	50.2	56	**130.6**
NW11696	33.4	61.9	46.3	47.4	36.2	63.5	59.0	47.0	49.3	57	**127.6**
NE11697	60.7	56.0	42.8	50.2	44.8	62.7	62.7	54.3	54.3	27	**120.0**
Mean	47.9	62.6	50.5	53.5	41.2	71.4	60.6	46.9	54.3		**124.8**

6. Regional Nurseries

In 2014, we continued to combine into one larger nursery the Southern Regional Performance Nursery (SRPN) and the Northern Regional Performance Nursery (NRPN). These were planted at Lincoln, North Platte , Sidney , and Alliance. At Clay Center, only the SRPN was planted. To fill out the nursery, we added a few other lines mainly to compare selections out of research for scab tolerance or drought tolerance to determine if they had merit. The NRPN and SRPN data from all locations is available at:http://www.ars.usda.gov/Research/docs.htm?docid=11932 . It was useful to see Kharkof and Scout 66, older wheat cultivars, continue to be very low yielding, indicating that breeding progress has been made.

7. Multiple-Location Observation Nursery

Seven locations in Nebraska (Lincoln, Mead, Clay Center, North Platte, McCook, Sidney, and Alliance) were planted and all were harvested . To better estimate the yield at key locations two replications were planted at Lincoln, North Platte, and Alliance. An additional location was collaboratively planted and harvested in Kansas. The Kansas site was very high yielding due to it being treated with fungicides and given very high fertility–to maximize grain yield. The eight locations (seven in NE and one in KS) were used for selection. The table below gives the grain yields for all of the harvested locations, the line average, and the rank of the top 10 highest yielding lines**.** In this nursery, we continued to use marker-assisted selection for line advancement. For the fourth year, we used genotyping by sequencing (GBS). Genotyping by sequencing was done in collaboration with Dr. Jesse Poland, KSU, because it is much less costly (less than 1/3 of the cost of other marker systems). We will continue to do to this and have secured funding to do this on earlier generation material. One novel twist that Jesse added was we are now reanalyzing the GBS data over years, thus creating a "training" population and tying all of our datasets together. Genotyping has many missing data points, but this approach has really helped us understand our materials. The 2014 data were quite interesting because were we able to look at phenotypic data (our traditional selection protocol), as well as the current year estimated breeding values (EBVs=EBV1) and those developed over four years (= EBV4). My comparing and selecting on phenotypic values, EBV1 and EBV4, our hope is not to lose promising line. In theory EBV4 and phenotypic selection should be the best. One change that we will add is a stratified selection where we will ensure that the highest yielding tall wheat lines, disease resistant wheat lines, etc. are retained. If you select predominantly on grain yield, you tend to select semi-dwarf lines. The top ten lines out of 270 experimental lines are below:

2014	Mead	Linc	C.Cent.	N. Platte	McCook	Sidney	Alliance	KS	Average	Rank
	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield	
Names3	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	(bu/a)	
NE14658	47.5	74.7	65.5	47.6	88.6	68.1	70.4	71.5	66.7	1
NE14537	49.3	74.8	58.9	50.7	97.4	73.8	64.3	64.3	66.7	1
NE14434	50.2	78.6	61.5	54.7	92.1	72.9	64.7	57.3	66.5	3
NE14606	39.3	72.1	59.9	52.7	97	82	61.1	66.8	66.4	4
NE14531	43.9	80.4	62.6	53.9	81.1	84	63.8	58.4	66	5
NE14696	34.4	79.5	68.1	40.6	91.5	72.6	69.5	70.6	65.8	6
NE14607	46.6	68.3	65	45.6	97.2	76.8	66.8	59	65.7	7
NE14401	41.6	63.6	59.4	51.1	73.3	78.9	71.7	84.3	65.5	8
NE14656	42.7	70.7	62.9	53.5	106.3	56.2	68.3	59.7	65	9
NE14647	45.8	65.3	60.6	54.1	101.8	68.9	67	55.4	64.9	10

Camelot ranked 26 in this trial. Freeman ranked 50. Goodsteark ranked 88.

8. Early Generation Nurseries

a. Single-plot Observation Nursery

Fourteen hundred and eighty-sixtwo lines were evaluated at Lincoln in 2014. Of the 1486 lines and checks, 1268 were red and 218 where white seeded or mixed red and white seeded. The lines included 71 one and two gene herbicide tolerant lines (mainly two gene), 193 possible FHB tolerant lines, 92 possible lines with WSMV tolerance, and 83 Hessian fly tolerant lines. In addition, 68 Clearfield observation plots were planted. All 1554 lines were harvested, as I have not liked visual selection. Those lines with acceptable yield were then test weighed and if the test weight was good, their protein was measured. Five hundred lines with good yield, test weight, and protein content were sent to the Seed Quality laboratory for micro quality evaluations. Two

hundred seventy lines were advanced. We will try to be more selective in this nursery so that harvesting all the plots will be very efficient.

b. Headrow Nursery

In 2013-14, 48,100 (of which 4000 were herbicide tolerant) headrows were planted at Lincoln. In general, the headrow nursery was a little larger than normal. . We harvested over 1800 lines and planted in 2014-2015. 1544 were selected for advancement. From the imi-headrows, 377 were selected for advancement. The main selection criteria for discarding headrows was black point or poor seed quality. Of the red and white wheat lines, 238 were sent to Scottsbluff for planting in our irrigated observation nursery.

c. F_3 bulk hybrids

The F_3 bulk hybrid nursery contained 1108 red, red and white segregating, or white seeded bulks. In addition, we planted 54 herbicide tolerant bulks (planted at Lincoln). Most bulks were planted at Mead (our main and best winter killing site) and many of those were planted at Sidney as a backup site in case of disaster at Mead. The number of F_3 bulks is high and we will attend to reduce it in future. . Over 50,600 head rows were selected for fall planting in 2014. The headrows were planted on time. In general, their emergence and stands were very good in the fall, but a heavy rai right after part of the field was planted led to washing and plot mixing.. The project goal remains to have sufficiently good segregating F_3 material to select about 40 - 45,000 headrows.

d. F_2 bulk hybrids

The F_2 bulk hybrid nursery contained 1063 bulks and check plots that were planted at Mead NE. Fifty-eight F_2 bulks with two genes for herbicide resistance were planted at Lincoln for selection. The bulks generally survived the winter, but some were winterkilled (those involving winter tender parents). We continued not sharing our bulk populations this year as the new Wheat Workers Material Transfer Agreement (WWMTA) require prior approval of bulk sharing for any subsequent segregating generation. There is no approved bulk sharing form attached to the WWMTA and the paperwork will continue to a major hurdle. As such, the path of least resistance is simply to not share bulks except with those that we have pre-existing bulk-sharing agreements (e.g. CIMMYT). No bulk is shared that includes parental germplasm that requires approval. While this curtailment of bulk sharing is unfortunate and in many ways a waste of resources (groups making the same crosses or not having access to crosses they wished they had made), the alternative concern is that some programs prefer not to share their segregating germplasm with other institutions and businesses.

9. Winter Triticale Nursery

In 2014, one new triticale line (NT06427) was recommended for release. Also, we selected additional lines for increase as possible replacements or to complement NE426GT, NE422T, and NE441T (a licensed line) which continue to perform well. Because triticale is a small market crop, we are carefully deciding how best to release new triticale cultivars so as to not cause inventory problems with the previously released cultivars. Our current thoughts are that we will most likely partner with a triticale seed supplier to merchandise our next release. We also expanded our collaborative testing area into New York, Kansas, and New Mexico.

NT06427 is a winter triticale (x Triticosecale Wittmack) cultivar developed cooperatively by the Nebraska Agricultural Experiment Station and the USDA-ARS and released in 2014 by the developing institutions. It was released primarily for its awnletted spike, good grain yield, and good forage yield when

compared to currently grown triticale cultivars. It is adapted to rainfed triticale production systems in Nebraska and in adjacent states. NT06427 will be licensed with the expectation that the name will emphasize the short awns on the spike as it is considered a valuable trait in forage small grains because feeding small grains hay with long awns is a mouth irritant and affects hay consumption.

NT06427 was selected from the cross NE96T431/Titan where the pedigree of NE96T431 is TSW250783//GWT88-12/LAD285. The cross was made in 2000. The F_1 generation was grown in the greenhouse in 2001 and the F_2 to F_3 generations were advanced using the bulk breeding method in the field at Lincoln, NE in 2002 to 2003. In 2004, single F_3-derived F_4 rows were planted for selection at Lincoln. There was no further selection thereafter. The $F_{3:5}$ was evaluated as a single four row plot at Lincoln, NE in 2005. NT06427 was identified in 2006 as the experimental line, NT06427, and selected for further testing in multilocation trials (Lincoln, Mead, and Sydney, NE). Thereafter it was tested in multilocation replicatied trials at the same three NE locations.

NT06427 was evaluated in Nebraska replicated yield nurseries starting in 2007 for grain yield. In 2008, limited forage trials began. In the Nebraska Triticale Grain and Forage Nurseries (2008 to 2013, Table 1), NT06427 was compared to our previous released cultivars NE422T, and NE426GT. NT06427 had significantly higher grain yield (3718 lba/a) than NE422T and was not significantly lower in grain yield than NE426GT. For forage yield (cut approximately 10 days after flowering) NT06427 was not significantly lower yielding (8112 lbs/a) than NE422T or NE426GT.

Other measurements of performance from comparison trials indicate that NT06427 is medium early in maturity (flowering 139 days after Dec. 31) , most similar to NE426GT and 4 days earlier than NE422T which is considered as being late in maturity. NT06427 is mid-tall triticale slightly shorter than NE426GT and significantly shorter than NT4422GT. In the two trials where winter injury occurred, NT06427 was not significantly different (78% winter survival) from NE422T and NE426GT, hence would be considered as comparable to the currently grown triticale cultivars. Historically winter triticale is not as winterhardy as the more winterhardy winter wheat cultivars, but in most years and locations in Nebraska, winter injury is minor.

Triticale has few diseases in Nebraska and there are no regional nurseries, hence there is little disease or insect data to report. NT06427 was tested in Kenya in 2012 and scored as 1 (on a 0 to 100 scale with 0 being low) for stem rust (caused by *Puccinia graminis Pers.: Pers. f. sp. tritici* Eriks & E. Henn.) using the races common to Kenya (TTKSK and its derivatives). In the same trial, popular wheat (*Triticum aestivum* L.) cultivars (Jagger, 50-60; Scout 66 known to contain Sr_2, 55/20; and Overland believed to contain Sr_{tmp}, 10) scored higher. NT06427 was also scored in Kenya for field races of stripe rust (caused by *P. striiformis* Westendorp f. sp. t*ritici*) and scored as moderately resistant. In Nebraska, when leaf (caused by *P. triticina* Eriks,), stripe, or stem rust were present on wheat, NT06427 would be considered as resistant. In years of high infection of ergot (caused by Claviceps purpurea (Fr.) Tul.), NT06427 has had very low infections. During its selection, lines with ergot are routinely discarded.

In positioning NT06427, based on performance data to date, it should be well adapted to most rainfed wheat production systems in Nebraska and in adjacent areas of the Great Plains where grain or forage triticale are grown. In limited testing outside of Nebraska, NT06427 is competitive to other Nebraska developed cultivars. NT06427 has not been tested under irrigation.

NT06427 is an awnletted, ivory-glumed cultivar. The coleoptile color is white. Its field appearance is most similar to NT0426GT, but can be easily separated from NE426GT because NE426GT is awned. The flag leaf is recurved and twisted at the boot stage. The foliage is green with a waxy bloom on the leaf sheath. The auricle is colorless or white and lightly pubescent. The neck is pubescent (hairy). The head is oblong and middense. The glume is pubescent, white, long, and the glume shoulder is wanting. The beak has an acuminate tip. Kernels are amber colored, elliptical in shape, moderately wrinkled, with a large and long brush. NT06427 was licensed to Ehmke Seeds and is expected to be marketed under the name Short Beard Thunder.

Development team: P. S. Baenziger (breeder-inventor), K. Vogel, S. Wegulo, T. Regassa, D. Santra, and G. Hein.

In 2014, 6 lines (including NE426GT and NE422T) were recommended for increase or re-increasing. It appears that NE422T has good forage potential for the Southern Great Plains. We are beginning to move to higher and more consistent grain yield levels, but identifying excellent forage types requires forage harvesting which is expensive and difficult for widespread trials. Though the markets for biofuels fluctuate with the price of oil and other geologically based fuels, we believe that there is a future for triticale in a biobased energy system. Triticale can be grown over the winter as forage or grain crop in areas where maize cannot be grown successfully. The grain will substitute for maize in animal rations and the forage can be used as forage, cellulosic ethanol feed stocks, or as a ground cover.

The 2014 grain yields from Nebraska are:

2014	Linc.	Mead	Sidney	Average	Rank	Bacterial	Winter	Height
	Yield	Yield	Yield	Yield		Streak	Survival	
Name	lbs/a	lbs/a	lbs/a	lbs/a		(1-9)	%	in
NT01451	3190	2368	3891	3150	8	3.3	100	44.1
NT05421	3641	3047	3829	3506	1	3.7	99	51.8
NT06422	3557	2476	3802	3278	5	4.5	99	48.1
NT06427	3314	1926	3742	2994	12	3.1	99	44.9
OVERLAND	3446	3019	3875	3447	2	1.8	98	36.1
NT07403	3773	2129	3481	3128	10	5.0	99	43.3
NT09423	3223	2663	3936	3274	6	2.0	100	44.6
NT10417	2291	1957	3912	2720	22	3.9	100	45.2
NT11406	3203	1697	3789	2896	14	3.0	100	44.9
NT11410	3380	1691	3440	2837	17	4.3	98	44.9
NT11428	3389	2399	3416	3068	11	3.3	100	51.5
NT12403	3258	2441	4005	3235	7	6.0	100	44.4
NT12404	3293	1868	3535	2899	13	6.1	100	43.9
NT12406	3155	2412	3859	3142	9	6.4	99	46.8
NE422T	2844	2034	3136	2671	24	4.2	100	56.9
NT12412	3008	1837	3348	2731	20	3.4	98	44.3
NT12425	3496	1956	3172	2875	15	3.0	100	51.7
NT12440	1936	1201	2910	2016	29	4.4	95	40.9
NT13403	2746	1819	3722	2762	18	5.8	99	45.4
NT13405	2259	1301	3548	2369	28	5.1	97	46.4
NT13410	2775	1812	3506	2698	23	6.3	99	47.5
NT13411	2305	1352	3563	2407	27	5.1	97	45.2
NT13412	1232	1195	3487	1971	31	4.7	91	44.5
NT13416	3444	2579	3977	3333	4	5.8	100	49.2
NE426GT	2588	2195	3499	2761	19	5.7	99	44.7
NT13420	2794	2051	3341	2729	21	6.8	99	44.7
NT13421	1817	1256	2909	1994	30	5.1	98	38.9
NT13429	2250	1720	3790	2587	26	4.8	99	47.9
NT13430	2514	1835	3627	2659	25	3.9	100	42.9
NT13443	4053	2761	3473	3429	3	3.4	99	56.3

GRAND MEAN	2939	2033	3584	2852	16	4	99	46
LSD	464	510	479			2		
CV	10	15	8			23		

The 2014 forage yields from Nebraska (thanks to Dr. Rob Mitchell, USDA-ARS) are:

entry	name	winsur	hdatejulia	height	yldlbsa	Rank	dmpercent	nitrogen	ivdmd	ndf	adf	adl
		%	After 12/31	in	lbs/a		%	%	%	%	%	%
1	NT01451	100	151	41.9	5645	9	26.8	1.92	71.33	61.07	34.95	5.13
2	NT05421	100	150	46.8	5587	11	29.3	1.67	69.11	62.02	36.19	5.35
3	NT06422	100	148	46.2	5489	15	29.9	1.80	71.53	58.58	33.63	5.01
4	NT06427	100	150	44.0	5985	6	28.4	1.75	70.10	60.32	35.00	5.15
5	OVERLAND	100	147	36.0	6059	5	29.0	1.90	71.53	60.46	34.51	5.09
6	NT07403	90	147	41.0	4896	21	31.2	1.68	69.81	60.15	34.72	5.05
7	NT09423	100	151	41.5	6569	2	27.0	1.86	70.80	61.10	35.16	5.24
8	NT10417	100	152	41.2	5189	18	26.6	1.87	71.11	61.68	35.38	5.19
9	NT11406	100	152	42.0	5348	16	28.2	1.71	70.69	59.70	34.51	5.02
10	NT11410	100	149	41.1	5598	10	28.2	1.79	70.91	59.74	34.44	5.14
11	NT11428	100	151	48.9	6244	3	27.8	1.75	70.77	61.73	35.46	5.14
12	NT12403	100	148	42.7	4964	19	29.5	1.73	69.61	59.85	34.89	5.10
13	NT12404	100	148	40.3	4825	22	30.8	1.59	69.23	59.20	34.45	4.96
14	NT12406	100	149	44.4	5863	8	29.3	1.87	69.74	59.22	34.08	5.17
15	NE422T	100	151	54.0	6241	4	27.3	1.74	69.29	63.44	37.04	5.19
16	NT12412	100	150	43.1	5294	17	28.6	1.81	70.83	59.40	33.89	4.93
17	NT12425	100	150	49.4	5923	7	29.1	1.57	69.40	61.43	35.68	5.05
18	NT12440	99	150	36.6	3051	28	28.7	1.99	72.42	58.46	32.97	4.83
19	NT13403	100	148	40.1	4028	25	29.6	1.75	71.04	58.41	33.41	4.96
20	NT13405	99	149	43.0	3015	29	28.5	2.00	71.43	59.98	34.03	4.93
21	NT13410	100	151	41.3	4070	24	28.1	1.93	71.43	59.05	33.53	5.04
22	NT13411	100	148	38.3	3907	26	28.4	1.79	70.49	58.77	33.74	4.99
23	NT13412	99	153	39.3	2599	30	26.7	2.08	70.93	61.38	34.56	5.05
24	NT13416	99	148	45.6	5557	13	30.7	1.70	70.62	58.42	33.06	4.95
25	NE426GT	100	150	42.7	5530	14	28.7	1.71	70.28	60.49	34.78	5.09
26	NT13420	100	148	42.2	4908	20	28.9	1.65	69.91	60.08	34.89	4.96
27	NT13421	96	153	34.9	3107	27	26.6	2.10	71.96	60.72	34.38	5.10
28	NT13429	99	152	44.8	4440	23	25.9	1.95	71.27	62.45	35.62	5.35
29	NT13430	100	150	40.1	5571	12	27.3	1.77	70.77	59.71	34.10	5.05
30	NT13443	100	150	54.4	7069	1	31.4	1.55	69.59	61.36	35.66	5.18
	MEAN	99.3	149.78	42.9	5086		28.6	1.80	70.60	60.28	34.62	5.08
	LSD	5.5	1.3	2.5	917		1.6	0.22	1.79	1.87	1.47	0.21
	CV	3.9	0.62	4.2	13		3.879	8.75	1.80	2.19	3.02	2.99

These trial results indicate that: 1. triticale produces more biomass and grain yield generally than wheat; 2. there is considerable GxE for forage yield; and 3. it very difficult to couple grain yield with forage yield. The comparison likely was affected by different stages of harvest as seen by the different dry matter contents.

Of the lines tested in all the grain and forage trials, NT09423 had good grain yield across the state, excellent forage yield in eastern NE. This highlights the need for testing our forage triticale lines in grain and forage trials across and beyond Nebraska.

The forage results from New York in 2014 are:

Year	Line	stage	% Dry Matter	DM T/A
2014	NE422T	early 10	13.60%	4.86
2014	NT01451	late 9	14.70%	4.87
2014	NT05421	9	13.40%	4.26
2014	NT09423	early 10	14.60%	4.99

The 2013 forage data from Sidney NE (thanks to Dr. Dipak Santra) are:

name	foragedry	Rank
	lbs/a Dry	
NE422T	5920	2
NT06427	5594	4
NT01451	5030	5
NT05421	6325	1
NT07403	4844	8
NT12403	4693	9
NT06422	5631	3
NT11406	3696	10
NT11428	4884	7
NE426GT	4964	6
MEAN	5158	
LSD	1049	
CV	16.89	

The 2013 grain yields from Nebraska and a collaborative site in KS are:

	Llincoln	Llincoln	Lincoln	Llincoln	Mead	**NEB.**	Rank	Kansas	**NE + KS**	Rank
2013	Height	Heading Date	Grain Yld	Test Weight	Grain Yld	**Avg. Yield**		Grain Yld	**Avg. Yield**	
name	(in)	Julian	Lbs/a	Lbs/bu	Lbs/a	**Lbs/a**		Lbs/a		
NE422T	60.3	150	2622	50.09	3826	**3224.0**	23	2512	**2986.5**	23
NE426GT	48.7	148	2482	47.16	3180	**2831.0**	29	2810	**2824.0**	29
NT01451	49.0	149	2641	47.30	3482	**3061.5**	26	2474	**2865.7**	26
NT05421	57.3	149	3550	50.89	4620	**4085.0**	7	2964	**3711.5**	7
NT05429	48.7	147	3870	48.85	3692	**3781.0**	13	2467	**3342.9**	13
NT06422	51.7	148	4186	47.49	3854	**4020.0**	9	2691	**3577.1**	9
NT06427	49.7	148	3005	46.86	3566	**3285.5**	22	2447	**3006.1**	22
NT07403	48.0	146	4291	52.14	4652	**4471.5**	3	2424	**3789.2**	3
NT09404	53.3	148	3116	47.82	3689	**3402.5**	18	2475	**3093.4**	18
NT09423	50.0	149	3768	49.88	4298	**4033.0**	8	2586	**3550.7**	8
OVERLAND	42.0	150	2867	58.71	3859	**3363.0**	19	2527	**3084.4**	19
NT10417	52.3	148	3429	45.53	3960	**3694.5**	16	2275	**3221.2**	16
NT10429	55.7	149	3274	51.57	5055	**4164.5**	6	2124	**3484.2**	6
NT10441	48.7	149	3532	48.30	3964	**3748.0**	14	1880	**3125.3**	14
NT11404	53.0	148	3411	47.16	3195	**3303.0**	21	2403	**3003.0**	21
NT11406	48.7	149	3342	46.58	3929	**3635.5**	17	1712	**2994.4**	17
NT11410	51.0	147	3763	47.34	4131	**3947.0**	10	1609	**3167.8**	10
NT11428	55.3	149	3708	49.03	3996	**3852.0**	11	1966	**3223.4**	11
NT11444	56.3	150	3276	48.91	4191	**3733.5**	15	3170	**3545.7**	15
NT12403	50.0	147	4002	53.28	4902	**4452.0**	4	2515	**3806.3**	4
NT12404	49.3	146	4230	49.95	4812	**4521.0**	2	2602	**3881.4**	2
NT12406	50.7	147	3728	50.36	3964	**3846.0**	12	1985	**3225.7**	12
NT12411	46.0	148	2275	46.20	3683	**2979.0**	28	2760	**2906.0**	28
NT12412	52.3	149	2784	48.82	3875	**3329.5**	20	2532	**3063.6**	20

The 2013 forage yields from Nebraska (thanks to Dr. Ken Vogel, USDA-ARS) and collaborative sites in Kansas and Oklahoma are:

	Mead	KS	OK		Rank
2013	Forage YLD	Forage YLD	Forage YLD	Aver For	Forage
name	lbs/a	lbs/a	lbs/a	lbs/a	
NE422T	8502	6975	2859	6111.8	15
NE426GT	8700	7827	4084	6870.3	2
NT01451	8385	8669	3403	6819.1	3
NT05421	8944	7502	3403	6616.4	7
NT05429	8864	6401	3539	6267.9	11
NT06422	8725	8803	4220	7249.2	1
NT06427	8597	6517	3539	6217.6	13
NT07403	8528	4874	3948	5783.3	21
NT09404	8154	5490	4220	5954.6	17
NT09423	7955	5711	4084	5916.4	18
OVERLAND	7156	3402	2723	4427.0	24
NT10417	8239	6874	3675	6262.8	12
NT10429	8916	6097	3812	6274.9	10
NT10441	8894	5659	3948	6166.8	14
NT11404	8282	7010	3948	6413.3	9
NT11406	7883	5674	3403	5653.5	23

NT11410	8859	7306	3403	6522.7	8
NT11428	8745	5045	3812	5867.0	19
NT11444	8652	5345	3403	5800.0	20
NT12403	8706	5679	3812	6065.4	16
NT12404	8214	5435	3539	5729.5	22
NT12406	8885	6642	4356	6627.5	6
NT12411	7969	8787	3675	6810.5	4
NT12412	8608	7666	3812	6695.3	5

The forage results from New York in 2013 are:

Variety	T/A DM
NT05429	3.56
NT06422	4.00
NT07403	2.88
NT0422T	3.61

The 2013 forage data from Sidney NE (thanks to Dr. Dipak Santra) are:

2013 Name	Height in	Forage DM Lbs/a	Rank	Dry Matter %
NE422T	52.4	4885	3	0.325
NT01451	39.5	4467	8	0.337
NT05421	47.3	5184	1	0.358
NT05429	41.3	4547	5	0.34
NT06422	41.0	4294	9	0.336
NT06427	40.3	5156	2	0.357
NT07403	42.5	4494	7	0.358
NT09404	42.0	4873	4	0.347
NT10429	46.0	4514	6	0.345
NT10441	40.0	4093	10	0.342
Avearge	43.21	4650.5		0.344
LSD	7.0	535.8		0.019
CV	11.1	7.9		3.9
Heritability	0.33	0.41		0.29

The 2012 forage results from Wisconsin were:

		Seeding Rate		Yield	
Variety		(seeds/packet)		Kg/ha	Rank
NE03T416		4400		4954	5
NT01451		4400		4813	7
NT05421		4400		5135	4
NT05429		4400		5215	2
NT06422		4400		5465	1
NT06427		4400		4862	6
NT07403		4400		5157	3
815		4400		4558	8

815 is a local check and it is clear that our lines can compete with the local lines in Wisconsin based on this year's data.

The forage data from North Platte in 2012 are (thanks to Dr. Jerry Volesky):

Triticale Plots 2012	
	2012
Entry	**- - - Tons/acre - - -**
Wheat Border	5.07
1010 Triticale	5.39
NT05429	5.97
NE03T416	6.08
Syn Exp	6.20
NT07403	6.21
NT05421	6.23
NT06427	6.23
NT06422	6.39
TriCal 348	6.58
ATR-626	6.59
NE422T	7.17
NT01451	7.29

Again our lines did very well compared to the local check 1010 Triticale.

The results for the 2012 forage trial at Sidney were (thanks to Dr. Dipak Santra):

name	Yield	NDF	ADF	Prot	RFV	TDN
	lbs/a					
GOODSTREAK	6312	54.6	35.6	11.8	104	62
NE422T	6193	52.15	32.8	11.4	113	65.2
NE426GT	6212	53.75	35.6	10.75	106	62
NT01451	6786	53.95	34.2	12.1	108	63.6
NT05421	6863	54.4	34.15	11.15	107	63.6
NT06427	6793	56.8	36.4	11.5	100	61.1
NT07403	6200	54.8	34.55	12.05	105	63.2
NT09404	7114	54.9	35.15	11.4	104	62.5
NT09423	6905	57.2	37.85	11.6	97	59.4
NT10441	7065	56.2	36.7	11.3	100	60.8
NT10418	7016	56.85	36.15	11.5	100	61.3
NT10429	6319	55.3	35.3	11.35	103	62.3
GRAND MEAN	6648.19	55.08	35.37	11.49	103.63	62.23
LSD	1240.4	3.33	2.71	1.52	9.04	3.06

The results for the 2012 forage triticale trial at Mead, NE are (thanks to Dr. Ken Vogel):

Name	Yield	IVDMD	NDF	ADF	ADL	NITROGEN	DM %
	Lbs/a						
OVERLAND	10108	70.22	54.45	31.65	4.39	1.55	0.4
NE422T	12454	68.6	61.44	36.89	5.04	1.36	0.34
NE426GT	12951	70.48	56.05	32.19	4.38	1.47	0.34
NT01451	12521	69.72	58.58	34.56	4.77	1.48	0.33
NE03T416	11809	70.99	54.77	32.69	4.37	1.38	0.35
NT05421	12638	68.59	58.61	34.62	4.81	1.39	0.35
NT05429	11780	70.88	52.51	31.36	4.16	1.39	0.37
NT06422	11863	70.46	53.42	31.72	4.29	1.39	0.38
NT06423	12090	68.26	57.81	34.59	4.8	1.4	0.36
NT06427	12372	69.58	56.72	33.41	4.51	1.44	0.35
NT07403	13075	71.14	52.02	30.42	4.02	1.44	0.4
NT08414	13083	69.22	56.13	33.59	4.48	1.37	0.33
NT08425	12359	70.43	54.79	32.07	4.31	1.47	0.35
NT09404	12892	70.1	56.79	33.36	4.64	1.57	0.34
NT09423	11698	69.67	58.38	34.4	4.63	1.49	0.33
NT10444	12955	70.93	54.49	32.26	4.4	1.44	0.35
NT10441	11509	69.83	55.79	32.37	4.52	1.41	0.35
NT10417	12236	70.32	55.5	33.11	4.44	1.31	0.36
NT10418	12670	69.1	56.56	33.28	4.41	1.37	0.36

NT10429	11199	68.29	59.09	34.93	4.64	1.45	0.36
NT10443	11951	68.24	61.18	37.01	4.87	1.36	0.35
NT11404	12088	70.02	56.46	33.3	4.54	1.5	0.34
NT11406	12924	69.98	57.33	33.68	4.59	1.38	0.33
NT11408	13906	69.67	55.87	33.2	4.51	1.39	0.35
NT11410	12771	70.1	55.73	33.53	4.47	1.36	0.34
NT11419	12596	68.6	57.78	34.15	4.74	1.27	0.35
NT11428	13220	68.73	59.29	34.97	4.62	1.42	0.34
NT11430	13203	70.49	55.66	32.76	4.39	1.32	0.35
NT11438	12609	69.05	57.14	34.3	4.6	1.32	0.35
NT11444	13567	68.18	59.06	35	4.54	1.32	0.35
GRAND MEAN	12437	69.66	56.65	33.51	4.53	1.41	0.35
LSD	1588	1.63	2.54	1.62	0.31	0.19	0.02
CV	9.05	1.65	3.18	3.42	4.9	9.75	4.07

The results for the 2012 grain triticale trials are:

	Grain Yield (lbs/a)	Grain Yield (lbs/a)	Grain Yield (lbs/a)	**State Avg Yield lbs/a**	**Rank**	**State Avg. Hdate (d after Jan.1)**	**State Avg. Height (in)**
name	Linc.	Mead	Sidney				
Overland	3100	4127	3139	**3455**	**25**	**129.7**	**38.0**
NE422T	3965	3732	1868	**3188**	**28**	**131.0**	**55.0**
NE426GT	4497	4593	3213	**4101**	**4**	**128.2**	**46.3**
NT01451	4312	4152	2785	**3750**	**20**	**129.5**	**44.5**
NE03T416	4520	4327	2708	**3852**	**14**	**122.2**	**46.8**
NT05421	4380	4680	2569	**3876**	**12**	**124.8**	**49.9**
NT05429	4087	4392	2967	**3815**	**17**	**121.2**	**43.4**
NT06422	4421	4794	3061	**4092**	**6**	**121.7**	**48.2**
NT06423	4266	4045	3235	**3849**	**16**	**128.2**	**48.9**
NT06427	4161	3880	2781	**3607**	**23**	**125.2**	**44.5**
NT07403	4482	4200	3372	**4018**	**9**	**119.4**	**45.0**
NT08414	3886	4369	2944	**3733**	**21**	**127.5**	**44.4**
NT08425	4392	4222	3106	**3907**	**11**	**128.0**	**47.2**
NT09404	4334	4392	2865	**3864**	**13**	**129.2**	**48.4**
NT09423	4826	5060	3183	**4356**	**1**	**129.9**	**44.6**
NT10444	4191	3960	3118	**3756**	**18**	**125.5**	**45.0**
NT10441	4516	4551	3086	**4051**	**7**	**129.0**	**45.3**
NT10417	4597	4964	2993	**4185**	**3**	**125.5**	**46.8**
NT10418	4128	3765	2319	**3404**	**27**	**124.0**	**51.3**
NT10429	4154	3695	2377	**3409**	**26**	**129.9**	**52.9**
NT10443	3760	3143	1678	**2860**	**30**	**131.4**	**50.8**
NT11404	4517	4586	2989	**4031**	**8**	**126.5**	**44.7**
NT11406	4747	4956	3075	**4259**	**2**	**129.4**	**46.6**
NT11408	4361	4472	2714	**3849**	**15**	**125.9**	**51.4**
NT11410	4276	4643	2960	**3960**	**10**	**126.5**	**44.3**

NT11419	4354	3575	2926	**3618**	**22**	**129.3**	**50.2**
NT11428	5144	4492	2662	**4099**	**5**	**129.2**	**50.9**
NT11430	4008	4328	2280	**3539**	**24**	**127.2**	**49.7**
NT11438	3595	3901	1544	**3013**	**29**	**129.0**	**52.1**
NT11444	4638	4244	2371	**3751**	**19**	**130.7**	**52.0**
LSD	865.19	678.46	538.78				
CV	10.23	9.64	11.93				
MEAN	**4287**	**4275**	**2763**	**3775**		127.1	47.6

The three-year (2012-2014) grain yield data summary for locations where we were able to harvest trials is presented below:

2012-	Hdate	Grain	Height	Hdate	Grain	Height	Grain	Height	**State**	**Rank**	**State**	**State**
2014	(d after	Yield	(in)	(d after	Yield	(in)	Yield	(in)	**Avg Yield**		**Avg. Hdate**	**Avg. Heigh**
	Jan.1)	(lbs/a)		Jan.1)	(lbs/a)		(lbs/a)		**lbs/a**		**(d after**	**(in)**
name	Linc.	Linc.	Linc.	Mead	Mead	Mead	Sidney	Sidney			**Jan.1)**	
NE422T	139.0	3143.7	58.2	134.0	3197.3	57.4	2502.0	51.6	3003.4	13	131.0	56.0
NE426GT	135.9	3189.0	49.1	132.7	3322.7	46.8	3356.0	42.6	3280.9	12	128.2	45.5
NT01451	137.9	3381.0	47.3	132.3	3334.0	47.1	3338.0	40.8	3352.6	10	129.5	44.3
NT05421	136.2	3857.0	54.6	126.3	4115.7	51.7	3199.0	46.2	3789.5	3	124.8	50.9
NT06422	132.9	4054.7	49.9	125.7	3708.0	52.5	3431.5	44.1	3768.9	4	121.7	48.2
NT06427	134.4	3493.3	47.1	129.7	3124.0	45.4	3261.5	43.7	3296.9	11	125.2	44.7
NT07403	129.5	4182.0	47.1	125.7	3660.3	46.6	3426.5	42.3	3797.5	2	119.4	44.2
NT09423	137.9	3939.0	48.0	133.0	4007.0	47.2	3559.5	40.8	3869.6	1	129.9	44.6
NT10417	135.9	3439.0	51.1	127.3	3627.0	48.1	3452.5	42.4	3512.9	8	125.5	46.0
NT11406	137.5	3764.0	49.4	132.7	3527.3	46.0	3432.0	43.8	3592.3	6	129.4	45.8
NT11410	135.5	3806.3	48.6	129.0	3488.3	46.5	3200.0	40.3	3535.5	7	126.5	44.6
NT11428	137.4	4080.3	54.7	132.7	3629.0	50.0	3039.0	48.8	3650.8	5	129.2	51.2
Overland	139.2	3137.7	38.4	131.0	3668.3	44.7	3507.0	34.7	3429.0	9	129.7	37.1

It is clear that we have made great progress in grain yields in triticale and that normally triticale has a higher grian yield than winter wheat. Marketing remains the major limitation to improving triticale's impact in modern agriculture.

10. Collaborative Research on Wheat Diseases

Dr. Stephen Wegulo, Department of Plant Pathology, and his staff continue to inoculate our experimental lines with wheat stem rust and Fusarium head blight (FHB, research funded by the U.S. Wheat and Barley Scab Initiative), and as time permits with wheat leaf rust. We continue to improve the greenhouse tests for stem rust. With the advent of the new race of stem rust, Ug99 (which can overcome some of the previously very durable resistance genes in wheat which were the main genes used in our program), we have greatly increased our efforts to introgress and pyramid new genes with our existing genes. (*Sr2, SrAmigo, SrTmp, SrR, Sr6, Sr22, Sr 24, Sr25, Sr26, Sr 36, Sr39*, and *Sr 40*).

Work continues on introgressing the resistance from *Agropyron* (*Wsm1*, the first real resistance/tolerance to wheat streak mosaic virus [WSMV] developed by Dr. Joe Martin, Kansas State University at Hays, Kansas and his co-workers) into adapted wheat varieties. The newer source for resistance/tolerance, *Wsm2*, developed by Scott Haley (CSU) in collaboration with KSU is also being introgessed. It seems to have less effect on agronomic performance, but also may not be as effective in Nebraska as *Wsm1*. A number of lines that may have this source of resistance were given to Gary Hein who is testing them in the field. The frequency of lines carrying virus resistance remains far lower than expected. There appears to be a genetic segregation distortion in heterozygous plants with the progeny often not carrying the gene or that the lines are lost during selection for

better agronomic types. However, we continue make numerous crosses as this is a key trait for Nebraska. The field assay is by far the best method to determine the tolerance to this virus. With the continued spreading of wheat soilborne mosaic virus into our Lincoln fields (a key early generation testing site), we are now able to select for wheat soilborne mosaic virus resistant lines and many of lines have this beneficial trait.

11. **Understanding the Stem Rust Resistance in 'Gage' Wheat:** T. Kumsa, P.S. Baenziger, S. Wegulo, M. Rouse, and Y. Jin.

Wheat (*Triticum spp.*) stem rust, caused by *Puccinia graminis* f. sp. *tritici* Eriks. & E. Henn. (*Pgt*), re-emerged as a devastating disease of wheat because of virulent race Ug99 (TTKSK). Many bread wheat (*T. aestivum* L.) cultivars grown in North America are susceptible to Ug99 or its derivative races that carry additional virulence. 'Gage' was released in 1963 mainly for its excellent field resistance to leaf rust (caused by *Puccinia triticina* Eriks) and stem rust. However, Gage's resistance has not been genetically characterized, which would facilitate its use in breeding programs. To better define the nature of the resistance in Gage, we created an F_2 population and the corresponding $F_{2:3}$ and $F_{4:5}$ families from crosses between Gage and stem rust susceptible cultivar 'Bill Brown'. Inheritance of resistance to *Pgt* race QFCSC and molecular marker analysis indicated that *Sr2* and additional genes explain the stem rust resistance of Gage. Using seedling plant infection types from the F_2, $F_{2:3}$ and $F_{4:5}$ families, we found that at least one dominant and most likely one recessive gene are involved in Gage's resistance. Seedling resistance genes acted independently of *Sr2* since *Sr2* is effective only at the adult plant stage. To further study this resistance, we created a recombinant inbred line population which is being tested at St. Paul, MN, increased at Ithaca, NE, and many lines are being tested next year in Kenya where the global Ug99 testing is being done.

12. **Association Mapping for Important Biotic & Abiotic Related Traits in a Structured Wheat Breeding Population.** I. Salah, J. Poland, K. Eskridge, A.Lorenz, and P.S. Baenziger

This research focuses on applying genomic selection methods in our breeding program using different statistical approaches to build new applicable protocols that will be used to improve our selection. We are specifically interested in effectively building the genotype by environment interaction into our models because we occasionally have years like 2012 (the earliest in the last 29 years) which are very unrepresentative for phenotypic selection and our main early generation selection nurseries are in eastern Nebraska when most of our wheat is grown in western Nebraska. We also hope to build over-year models to ranks lines that are developed in different years to see how they are predicted to perform in the future. However, we are constantly adding new germplasm into our breeding program and it is presumed that with this new germplasm we can also bringing in new alleles which will not have been seen in previous years. As such we will need to blend current year genotyping and phenotyping with our over year genotypng and phenotyping so as not to bias our selection only toward those alleles that we have previously used in our breeding program. In 2015 we have expanded our genotyping form the Duplicate (preliminary yield trial, ~ 273 lines) to the preliminary observation nursery (~2000 lines).

13. **Fusarium Headblight (FHB) Research:** Stephen Wegulo, Guihua Bai, P. S. Baenziger

In previous research, we found *Fhb1,* a major gene for scab (syn. Fusaium head blight) tolerance, was not pleiotropic or linked to genes that reduce grain yield. We are using high yielding *Fhb1* lines from segregating populations and Wesley *Fhb1* study in our crossing block. For the first time, we are seeing lines in our multiple-location observation nursery that contain *Fhb1,* indicating our breeding strategy is beginning to work. In addition, Dr. Guihua Bai has created a number of Overland backcross *Fhb1* lines, which are

also extensively being used in the greenhouse-crossing block. Overland has a native tolerance which with the added tolerance conveyed by Fhb1 could be extremely valuable in creating new cultivars with tolerance to scab. Of course, Overland has been a very popular and high yielding cultivar in Nebraska, which makes it use as a parent very attractive. Finally, Guihua has made a number of NE06607 *Fhb1* lines which may have value in our organic breeding research, as NE06607 has the right combination of disease resistance, agronomic performance, and end-use quality attributes.

14. Breeding for Organic Systems: Richard Little, P. S. Baenziger, Teshome Regassa

In 2013 and 2014, the Organic State Winter Wheat Variety yield trials (SVT) at Clay Center were planted after alfalfa rather than after soybeans as in previous years. Planting after alfalfa enabled timely planting on September 24 in 2014 and October 3 in 2013 compared to as late as October 31 in previous years and contributed to yields several bushels higher than in conventional trials in 2014. The small overlap in number of lines being tested in conventional and organic environments is a testament to differential criteria and performance. See the following table and http://cropwatch.unl.edu/web/varietytest/wheat. The high LSD indicates that the top 17 lines were not significantly different than the top-yielding line. Three new experimental lines, NE10507, NE11499, and NE12589 yielded in the top five.

The second and final year was completed for testing 12 cultivars and experimental lines in environments after either soybeans or alfalfa in a "Nitrogen-Use-Efficiency-for-Quality" experiment. Baking of white bread and reconstituted whole wheat bread is in process for each of these lines at 2 or 3 protein content levels. The samples are composites of wheat from both alfalfa and soybean environments. Samples from the soybean environment were cleaned on a Carter Density Separator to remove bunt spore balls. Cold soils from this environment, planted five weeks after the alfalfa environment, were conducive to spore germination. Soil samples were collected from each plot in early spring and in July of 2014. Soil nitrogen, nitrate, and ammonium changes will be compared to the amount of nitrogen in the harvested grain to determine whether low protein lines that bake well use as much nitrogen as the high protein lines. Karl 92 and Lyman are the benchmark high protein lines on different ends of the yield spectrum.

Cultivar	SVT14 CC Organic Grain Yield (bu/acre)	SVT14 CC Conventional Grain Yield (bu/acre)	SVTCC Organic Grain Protein Content (%)
Expedition	72		14.2
NE10507	72		13.0
NW03666 (W)	71		13.7
NE11499	71		14.9
NE12589	70		13.6
NE09521	70		13.6
Lyman	68		14.7
Goodstreak	68		14.4
Camelot	68	58	14.0
Overland	67	63	13.9
NW03681 (W)	67		14.3
SD07165	67		13.1
NE06469	67		13.7
Freeman	66	57	13.6
NW07505 (W)	66	60	13.4
NE07409	65		13.1
NE06607	65		14.0
McGill	64	54	13.3
NE08659	63		13.3
NE12662	63		13.8
Arapahoe	62		14.0
NE07444	62		14.2
NIO8708	62		13.9
Wahoo	60		13.2
Karl 92	57		15.3
NE12524	56		14.8
Pronghorn	56		14.2
NE08457	54		14.4
NE02558	54		13.7
Turkey	52	43	14.5
NW09627	50		13.6
Scout 66	47	38	14.3
Mean	63	54	13.9
LSD.05	7	6	0.3

15. Variation for Grain Mineral Concentration in a Diversity Panel of Current and Historical Great Plains Hard Winter Wheat Germplasm. Mary J. Guttieri, P. Stephen Baenziger, Katherine Frels, Brett Carver, Brian Arnall, and Brian M. Waters**.**

Wheat grain mineral concentrations tend to decrease as yields increase, therefore breeding for yield improvement may have reduced wheat nutritional quality. The objectives of this study were to survey grain mineral concentration in Great Plains hard winter wheat to assess: 1) the heritable variation for grain mineral concentrations in the germplasm pool; 2) the effects of more than 50 years of wheat breeding on mineral

concentrations; and 3) opportunities to exploit the underlying physiological relationship between grain protein concentration (GPC) and grain mineral concentration to improve nutritional quality. Grain mineral concentrations were measured in a panel of 299 winter wheat genotypes grown in 2012 and 2013 in Oklahoma and Nebraska. Cadmium and Li concentrations were most heritable across environments, and the low heritabilities of Fe and Zn concentrations will challenge direct breeding efforts, particularly within low-yield environments that minimize genetic variance. Within the subset of cultivars released from 1960 to 2014, grain yield increased 0.58 to 1.25 % yr^{-1}, and Zn concentration decreased 0.15 to 0.26% per year, relative to the reference cultivar, 'Scout 66.' Grain concentrations of Fe, P, and S also trended lower over this time period. Significant genetic variation persists within contemporary germplasm: among 93 cultivars released since 2000, Zn concentration max:min ratios ranged from 1.5 – 2.3, depending on environment. The positive interrelationship between GPC and grain Fe and Zn concentrations could be exploited in a yield-neutral breeding strategy that selects genotypes based on positive grain protein deviation in multiple environments.

16. Prospects for Selecting Wheat with Increased Zinc and Decreased Cadmium Concentration in Grain. Mary J. Guttieri, P. Stephen Baenziger, Katherine Frels, Brett Carver, Brian Arnall, Shichen Wang, Eduard Akhunov, and Brian M. Waters

Wheat (Triticum aestivum L.) is a primary staple cereal and a significant source of mineral nutrients in human diets. Therefore, increasing concentration of the essential mineral, zinc (Zn), and decreasing concentration of the toxic mineral, cadmium (Cd), could significantly improve human health. Because plant mechanisms for uptake and translocation of Cd and Zn are related, we assessed both Cd and Zn concentration to evaluate their independence in hard winter wheat germplasm. Grain Cd concentration of some genotypes grown in Nebraska trials were above the Cd Codex guidance level (> 0.2 mg kg-1), and highly repeatable differences in grain Cd were found between pairs of low and moderate-Cd commercial cultivars. Grain Cd concentration was predicted by Cd concentration in above-ground plant tissues at anthesis. However, grain Zn concentration was not predicted by Zn concentration in above-ground plant tissues. Genome-wide association scans using high density SNP markers identified markers on 5AL associated with grain Cd in a region homoeologous to the Cdu1 locus on 5BL in durum wheat (Triticum turgidum L. var. durum Desf.). Genetic regulation of grain Cd concentration in bread wheat may be more complex than in durum wheat because epistatic interactions between SNP markers were identified, and not all variation was explained by SNP marker haplotypes. SNP marker associations with Zn concentration were weak and inconsistent across trials, and Zn concentration was independent of 5AL SNP markers. The independent genetic regulation of grain Cd and Zn concentrations indicates that breeding low Cd hard winter wheat genotypes without reducing Zn concentration has high potential for success.

17. Choosing the Best Vegetation Index for Use in Nitrogen Use Efficiency Selection in Winter Wheat. Katherine Frels, Mary Guttieri, P. Stephen Baenziger

Nitrogen use efficient (NUE) crops are needed to reduce increasing nitrogen costs and environmental concerns. However selecting for NUE wheat is difficult due to the labor intensive and destructive nature of traditional phenotyping methods. Canopy spectral reflectance (CSR) is non-destructive, quick, and less labor intensive phenotyping method that measures incident light reflected by the plant canopy. Reflectance values for specific wavelengths are selected and used to calculate vegetation indices such as Enhanced Vegetation Index (EVI). These vegetation indices can be used to estimate specific traits related to nitrogen use efficiency such as biomass, canopy N content at flowering, and yield. During the 2012 and 2013 growing seasons, a 299-genotype hard winter wheat association mapping panel grown near Ithaca, NE was phenotyped weekly from anthesis to physiological maturity using CSR. Biomass samples were harvested at anthesis and

physiological maturity. Protein concentration in vegetative tissues and grain was measured using a Perten DA7200 diode array NIR (Hägersten, Sweden). Grain N yield was calculated as (grain yield x grain protein content x 0.01)/5.7. Several vegetation indices were calculated from this data set. The plant productivity traits such as anthesis biomass, grain yield, and grain N yield were compared with the vegetation indices. In 2012, a year with a yield limiting environment, EVI (Enhanced Vegetation Index) was highly heritable and showed high correlation with all plant productivity traits. In 2013, an optimal yield year, all VI had high heritability but were less sensitive to genotype differences. Alternative VI or analysis methods will be needed for optimal years.

18. Breeding for Nitrogen Use Efficiency in Hard Winter Wheat Using Canopy Spectral Reflectance and Genomic Selection Katherine Frels, Mary Guttieri, P. Stephen Baenziger

Nitrogen use efficient (NUE) crops are needed to reduce increasing nitrogen costs and environmental concerns. However, traditional phenotyping methods for NUE are labor intensive and destructive. Canopy spectral reflectance (CSR) is non-destructive, quick, and less labor intensive phenotyping method that measures incident light reflected by the plant canopy. Reflectance values for specific wavelengths are selected and used to calculate vegetation indices that estimate traits such as chlorophyll content and biomass. During the 2012 and 2013 growing season, the USDA-NIFA Triticeace Coordinated Agricultural Project (TCAP) supported proximally based CSR phenotyping in the 299-genotype hard winter wheat association mapping panel grown near Ithaca, NE. CSR data was collected weekly from anthesis to physiological maturity using a dual-fiber optic system allows for adjustment to incident light. Entry mean heritability of vegetation indices was calculated, and the most heritable indices were used in a G-BLUP genomic selection model using SNP markers. Prediction accuracy was estimated using 10 fold cross validation replicated 100 times. In 2012, accuracy for EVI phenotypes ranged from 0.38 for week 1 EVI to 0.57 for week 5 EVI showing that genomic selection combined with CSR data was successful in predicting unphenotyped lines within same year. Analysis for 2013 and testing the prediction accuracy of genomic selection and CSR data across years/environments is ongoing.

19. Hybrid Wheat. Nick Garst, Amanda Easterly, P. Stephen Baenziger, Amir Ibrahim

The interest in hybrid wheat has been in the literature for the better part of the 20th century, and work has been undertaken by a number of different seed companies, but a number of challenges have limited its success. The constraints of budgeting, logistics and biological limitations of hybridization in an autogamous species, and the time investment in feasibility projects ultimately led to the end of a number of programs. It has been argued that hybrid wheat may not be a feasible undertaking as the crop lacks the mechanical advantages to seed production and predisposition to cross-pollination, a phenomenon that has made hybrid maize a profitable endeavor. Research has begun to evaluate Nebraska breeding lines for better male parent characteristics to improve the amount of pollen available for cross-pollination. In wheat, recent estimates of yield increase of hybrids over elite parents has been estimated to be at 10.7%. Likewise, increased resistance to pathogens and pests has been noted . As such, the goal of this research is to evaluate the extent to which yields of wheat could be increased in hybrids, to develop commercially successful varieties for farmers in the Great Plains.

Three systems by which to produce hybrid seed have been proposed in the literature. The first is through use of cytoplasmic male sterility (CMS) in a similar manner as the A-, B-, and R-Line system used in generation of hybrid sorghum. Wheat lines with a *Triticum timopheevi* Zhuk. cytoplasm are often used for the A-line and produce stable cytoplasmic male sterility. CMS presents a challenge, however, in that A- and B-lines must be developed and maintained prior to any large-scale production of hybrid seed. The second

method of seed production is through use of thermo- or photoperiod-sensitivity genetic male sterility, a process that comes with a number of considerations for the logistics of managing and maintaining seed quality. The third involves the chemical emasculation of female parents through use of chemical hybridization agents (CHAs) that are also referred to as gametocides. Commercial production of these chemicals has been in place for a number of years. The use of CHAs has limitations in that the window of application is small and requires careful calibration and application for highest efficacy, but provides a simple approach and is conducive for large-scale production of hybrid seed.

In order for hybrid wheat to be commercially successful, a number of characteristics must be considered. First, we must find effective hybridization system on a large scale. For this, the small grains program at UNL will be developing and examining potential hybrids developed through use of CHAs, then evaluating the potential for a CMS system to produce commercial hybrids. Crossing blocks were planted in the fall of 2014 for treatment with CHA in 2015 to develop a set of experimental hybrids. , Hybrid seed comes at an annual cost to farmers, who are able to obtain seed at low cost from local co-ops or public breeding programs. The performance of a hybrid must well exceed that of any current commercial cultivars in either yield, vigor, disease- and pest-resistance, the ability to seed at a reduced rate, or any combination thereof to be worth the added cost. With this in mind, evaluation must be made to precisely determine the amount of heterosis exhibited for yield and other key traits in hybrid wheat such that the increase in productivity justifies the cost for both producers and researchers and will be examined in our experimental population of hybrids in the 2015/2016 and 2016/2017 growing seasons. Greenhouse work to identify R-lines is underway and is being done in conjunction with the introgression of male sterile cytoplasm into Nebraska-adapted winter wheat lines. Most current wheat breeding is done for the development of inbred cultivars, and as such, no true heterotic pools have been identified. Through utilization of modern genomic systems, we will work to build reliable and high-performing heterotic pools for hard winter wheat. Finally.

Another major pitfall for the success of hybrid wheat has been the cost of producing hybrid seed. Due to the cleistogamous nature of wheat, the amount of pollen available to pollinate male sterile (female parents) is low. The lack of pollen requires hybrid production fields to be planted with more male parents to get proper cross-pollination. Production costs increase because the product (F1 seed) is planted on less area. Research is being conducted on improving certain characteristics which would increase the amount of available pollen. The first of these characteristics is anther extrusion which is the ability of the wheat anthers to break out of the spikelets. Initial ratings for anther extrusion were done during the 2013/2014 growing season with some success. Research in the 2014/2015 growing season will focus on better calibrating the metric and rating the parents in the crossing block. Lines which have the highest ratings for anther extrusion will then be evaluated for amount of pollen shed, pollen flow (distance traveled), and pollen viability during the 2015/2016 growing season. The goal is to validate the selections and look for correlations between floral traits.

20. **Enhancing wheat (*Triticum aestivum* L.) drought tolerance using SNP markers based on high throughput genotyping by sequencing technology.** Waseem Hussain, P. Stephen Baenziger, Mary Guttieri)

Drought globally is the most wide spread limitation to wheat productivity and stability in rainfed systems. The Great Plains wheat belt has been battling drought for years. Consequently developing wheat cultivars with enhanced drought tolerance and high yield has been the focus of many wheat improvement programs. Improving drought tolerance is challenging due to its complex nature and previous studies conducted in identifying key genes/quantitative trait loci (QTL) were based mostly on low-density markers and not able to provide precise information about the numbers and locations of QTLs controlling the traits related to drought. This present study will grow lines across a diverse range of environments (Lincoln, Mead, Grant, Sidney, Alliance and North Plate) where different levels of drought naturally occur with following

objectives: (1) Screening recombinant inbred lines (RILs) and their parents (Harry and Wesely) for grain yield components and several morpho-physiological traits in response to drought. (2) Developing high-density SNP markers for better marker trait association using genotyping by sequencing approach. (3) Assessing the stability of the various morpho-physiological traits and investigating the occurrence of genotype x environment interaction. (4) Identification of QTLs and QTL x environment effects for several morpho-physiological traits. The ongoing research will facilitate fine mapping of selected trait genes in response to drought, providing a foundation enabling the development of superior wheat varieties.

21. Combining ability for tolerance to pre-harvest sprouting in wheat (Juthmas Fakthongphan, Robert Graybosch and P. Stephen Baenziger)

Pre-harvest sprouting (PHS) can have a significant impact on wheat (*Triticum aestivum* L.) production, yield and end-use product quality leading to massive economic losses.. Red wheats are normally more resistant to PHS than white wheats. The objective of this study was to identify red wheats capable of donating genes for PHS tolerance in white wheats, independent of red seed color. A factorial (M × N) mating was conducted using eight red wheats: 'Niobrara', 'Wesley', 'Arapahoe', NE98466, CO960293-2, 'Jagalene' NI01812 and 'Plainsman V' and six white wheats: 'Nuplains', NW99L7068, 'RioBlanco', 'Cayuga', NW97S218, and 'Peck'. General combining ability (GCA) for individual parents and specific combining ability (SCA) for specific crosses was used to identify effective donor red wheat parents. GCA and SCA were calculated from a pre-harvest tolerance score (Delta Value) determined after testing head selections in a misting chamber, and from Falling Number measurements of field-grown materials. GCA amongst red parents (GCAr) was significant for both Delta Value and Falling Number, but not in white parents (GCAw). GCA or SCA by environmental interactions, with the exception of the Delta Value from GCAr, were significant. Jagalene and Niobrara were identified as potential red wheat genetic reservoirs for additional genes of PHS tolerance. A significant correlation of SCA of Falling Number and SCA of Delta Value was detected ($r = 0.38$, $n = 48$, $P = 0.007$). Falling Number assay can be replaced by Delta Value assay for evaluating PHS tolerance in wheat breeding programs in areas in which pre-harvest sprouting is not routinely observed.

IV. GREENHOUSE RESEARCH

In 2012, the majority of F_1 wheat populations were grown at Yuma, AZ. Mainly populations needing additional crosses are being grown in the Lincoln Greenhouses. This change reduced our greenhouse space and greenhouse labor, and provided much greater quantities of F_2 seed. We made over 100 triticale crosses, over 100 barley crosses and over 1000 wheat crosses in last year's fall, winter, and spring greenhouses.

V. PROPRIETARY RESEARCH

Public Private (University of Nebraska) Collaborations:

In 2009, the University of Nebraska decided to sustain the wheat breeding project via enhanced collaborations with commercial companies spanning the value chain. The University of Nebraska-Lincoln (UNL) has had a long-standing arrangement with BASF, providing access to the Clearfield technology. Infinity CL and Settler CL are outcomes of this research. We are now concentrating on two-gene herbicide tolerant wheat cultivars. In 2009, UNL began collaboration with ConAgra (now part of Ardent Mills). They support our McCook Nursery and provide valuable information on the end-use quality of our lines at that site, which is a key sourcing site for their Colorado mills. In 2010, UNL developed a collaboration with Bayer Crop Science that allows non-exclusive access to UNL germplasm and is in accordance with the principles for collaboration approved by the National Association of Wheat Growers and with the U.S.

Wheat Associates Joint Biotechnology Committee. This collaboration has led to extensive collaborations and interactions on genetics, plant breeding, and crop physiology. Having their excellent staff in Lincoln has been very advantageous to our students and their interactions also. In 2012, we evaluated over 900 doubled haploid lines created in collaboration with Limagrain and are evaluating lines in replicated trials at numerous locations. We continue to develop germplasm exchange agreement with private companies as their germplasm is becoming increasingly relevant. Our goal continues to be the "People's University" and to work will all public and private wheat researchers in a manner compatible with the landgrant mission.

USDA-ARS projects at the University of Nebraska are not party to these agreements.

We received our eleventh year of research and development fees from an agreement with Paramount Seed Farms (a commercial seed company) for the exclusive release of our winter barley germplasm. We are fortunate that they took the initial risk of building a market for our germplasm when no one else was interested. No new barley lines were released in 2014, but P-845 (released in 2013) had a good year.

We had extensive winterkilling on barley in eastern Nebraska. At Lincoln, it was mainly due to blowing (the plants were destroyed by wind and blowing soil). At Mead, the winterkilling was mainly due to low temperatures. Of the two locations, the data from Mead is more valuable as winter survival under low temperatures is the more common occurrence. We were able to harvest yield trials at Colby, KS (good yields despite drought) and Sidney, NE (lower yields due to poorer stand establishment caused by heavy rains after planting). We were able to harvest sufficient seed from Lincoln to advance or breeding program. We have made substantial progress in working with local brewers (which are expanding), supported growers to plant their first commercial spring malting barley field (with great advice from Drs. R. Horsley, K. Smith, and J. Wiersma) for local beer production and hope to have local craft maltsters/distillers in Nebraska in the future.

Though the winterkilling was severe in eastern NE where are main breeding nurseries are, we were able to salvage the breeding program. In fall, 2014, we planted a new set of F2s and the surviving F3 populations. Our headrow nursery was reduced by about 30% but we expect the lines to be very winterhardy. The remaining nurseries have their normal size.

Figure 1. Winter survival of winter barley at Mead Nebraska. As can be seen the winterkilling was most severe in the winter barley block followed by the winter triticale block. Except in segregating bulk populations with spring wheat parents, there was no winterkill among the wheat lines. Where virtually all of the winter barley was killed (a Barley CAP trial and the winter malting barley trial), the surviving plots were winter wheat check plots. The barley that survived the winter was the Nebraska intermediate and elite trial and the F_3 populations, which previously survived the winter of 2013 as F_2 populations

With the current level of private sector investments in research, additional public-private interactions are to be expected and we are developing relationships with many other organizations. A key goal will be to develop working relationships that benefit the producer, the customer, and the public good.

The 2014 barley data are:

Name	Lincoln Winter Survival	Mead Winter Survival	Colby, KS Heading Date	Colby, KS Yield	Sidney,NE Yield	Average Yield	Rank	Colby, KS Moisture	Colby, KS Test Wt	Average Height
	%	%	Julian	lbs/a	lbs/a	lbs/a		%	lbs/bu	in
P-713	19.3	68.0	141.9	2978	2041	2510	18	10.8	44.8	26.9
P-721	5.9	84.1	142.1	2872	1918	2395	23	10.1	45.9	26.2
P-954	10.9	83.3	142.9	3186	2488	2837	6	10.8	47.6	26.0
TAMBAR 501	3.3	71.4	140.2	2651	1322	1987	34	10.2	41.4	25.6
NB09437	11.5	74.7	142.6	2565	908	1737	37	11.4	47.9	27.6
NB09441	0.0	67.7	137.7	2500	879	1690	38	10.0	41.4	25.9
NB10403	11.7	79.2	137.8	2028	2763	2396	22	11.5	45.8	27.8
NB10409	8.1	74.3	143.0	2931	1507	2219	29	11.1	51.2	28.1
NB10417	0.0	80.7	139.1	2845	1986	2416	21	10.3	43.7	25.0
NB10420	2.7	40.1	139.9	2413	1719	2066	31	10.6	46.9	26.2
NB10425	2.8	67.3	141.8	3077	1555	2316	27	10.2	44.7	27.4
NB10440	2.7	71.3	139.7	2598	1543	2071	30	11.4	46.5	27.7
NB10444	0.0	64.7	140.2	2596	3157	2877	3	11.2	45.3	26.1
P-845	2.7	79.9	141.1	3084	2530	2807	7	10.8	46.9	24.5
NB11414	0.0	40.9	142.3	2841	2953	2897	2	10.7	46.0	26.0
NB11416	11.0	65.6	141.5	3212	2107	2660	12	10.6	43.7	27.5
NB11418	9.3	71.5	141.7	2885	2489	2687	10	10.5	46.0	24.8
NB11430	0.0	75.4	139.9	2925	2124	2525	17	10.9	47.9	28.0
NB12419	16.6	82.6	142.4	3153	1853	2503	19	11.0	45.4	27.1
NB12421	53.4	83.5	142.8	3423	2261	2842	5	12.0	44.8	25.9
NB12422	3.4	79.1	142.7	3359	1168	2264	28	10.4	47.8	26.1
NB12424	0.1	72.6	143.0	3181	1524	2353	25	11.0	47.4	25.3
NB12425	21.7	83.4	142.6	3336	2689	3013	1	10.8	45.4	25.7
NB12426	2.7	81.4	142.4	3249	1920	2585	15	11.2	47.3	28.2
NB12431	2.8	74.3	140.7	3266	2430	2848	4	11.1	46.5	24.4
NB12433	-0.1	52.7	141.2	3149	1929	2539	16	11.2	47.7	23.7
NB12434	18.3	76.1	140.2	3152	2360	2756	8	10.2	44.5	24.9
NB12436	5.9	65.1	140.7	3055	1646	2351	26	10.9	46.0	27.4
NB12437	21.6	73.6	141.7	3122	1637	2380	24	10.3	45.8	26.7
NB13401	0.0	82.7	142.1	3056	2266	2661	11	10.4	45.2	27.2
NB13415	9.4	61.0	141.3	2661	2532	2597	14	10.7	45.9	27.4
NB13430	0.1	51.3	141.1	2905	1965	2435	20	10.8	42.3	26.2
NB13434	0.0	30.5	144.2	2333	1641	1987	33	10.9	44.8	27.1
NB13435	0.0	46.3	143.0	2649	2624	2637	13	11.5	47.4	26.1
NB13436	0.0	38.1	143.0	2888	2617	2753	9	11.2	47.7	24.4
NB13437	0.1	21.6	142.1	2346	954	1650	39	11.0	43.0	24.9
NB13438	0.1	28.3	142.1	2509	1433	1971	35	10.9	44.5	23.3
NB13440	0.0	13.4	144.1	2295	572	1434	40	10.9	45.6	23.1
NB13441	0.0	45.3	138.4	2702	1048	1875	36	11.2	45.9	22.2
NB13442	0.0	33.2	143.5	2611	1519	2065	32	12.4	43.9	24.5
GRAND MEAN	**6.4**	**63.4**	**141.5**	**2865**	**1914**	**2390**		**10.9**	**45.7**	**26.0**
LSD	**6.8**	**19.2**	**2.1**	**633**	**1505**			**1.6**	**6.6**	
CV	**99.4**	**28.6**	**0.8**	**11**	**48**			**7.6**	**7.3**	

Of the released cultivars (Table 1), P-954 did very well as expected because it is one of the most winterhardy lines that we have developed. P-845 (released last year) also did very well. One of the surprises was that TAM BAR 501 (developed in Texas and which normally has acceptable winterhardiness) did poorer than normal in Colby, KS and Sidney, NE.

The 2013 barley data are:

	Colby			Lincoln				Mead					
	Plant Height	Grain Yield	Test Weight	Heading Date	Plant Height	Lodging (rate)	Grain Yield	Heading Date	Plant Height	Lodging (rate)	Grain Yield	Mean Yield	
Name	Inch	lbs/a	lbs/bu	After April 1	Inch	0-9	lbs/a	After April 1	Inch	0-9	lbs/a	lbs/a	Rank
NB12437	22	1505	45	19	33	0	5212	22	31	2	5664	**4127**	**1**
NB11430	23	1700	45	18	34	0	5369	20	31	1	5242	**4104**	**2**
NB10425	21	1946	47	19	33	0	5329	24	33	1	4993	**4089**	**3**
P-845 (NB99845)	18	1670	45	19	31	0	5247	23	30	0	5240	**4052**	**4**
NB09404	21	1720	46	18	35	0	5084	20	33	0	5242	**4015**	**5**
NB12424	18	1576	45	19	31	0	5144	23	32	0	5278	**3999**	**6**
NB12419	20	1890	48	20	31	0	4784	23	32	0	5237	**3970**	**7**
NB12434	20	1551	47	17	31	0	5155	21	30	2	5082	**3929**	**8**
NB09409	19	1782	47	19	32	0	5057	23	33	2	4942	**3927**	**9**
NB09410	21	1665	50	19	36	0	4968	22	33	0	5047	**3893**	**10**
NB10444	20	1724	49	18	29	0	4946	21	30	2	4973	**3881**	**11**
NB12431	18	1266	45	18	30	0	5485	22	30	1	4795	**3849**	**12**
NB12426	20	1609	43	19	34	0	4822	24	33	2	5062	**3831**	**13**
TAMBAR 501	19	1518	39	18	31	0	5328	20	31	1	4646	**3831**	**14**
NB12421	19	1661	45	20	30	0	4938	24	30	2	4892	**3830**	**15**
NB10417	19	1621	44	18	32	0	5429	19	30	2	4304	**3785**	**16**
NB09437	21	1463	47	19	36	0	5246	22	31	1	4550	**3753**	**17**
NB11416	20	1585	42	19	33	0	4990	22	30	4	4670	**3748**	**18**
NB10403	23	1251	43	15	34	0	5216	18	33	1	4774	**3747**	**19**
NB12425	20	1746	47	20	31	0	4709	23	33	3	4762	**3739**	**20**
NB11414	19	1859	42	18	32	0	4804	25	32	0	4456	**3706**	**21**
NB09425	18	1453	44	19	29	0	4789	23	28	1	4838	**3693**	**22**
NB10420	21	1434	36	15	35	0	5027	19	33	0	4584	**3682**	**23**
P-713	20	1638	49	19	34	0	4567	22	35	3	4724	**3643**	**24**
P-954	17	1472	38	19	31	0	4602	23	31	4	4831	**3635**	**25**
NB12422	19	1732	46	19	31	0	4307	22	31	2	4794	**3611**	**26**
NB12436	21	1713	44	20	34	2	4451	22	33	2	4622	**3595**	**27**
NB10440	21	1577	52	17	32	0	4772	21	33	1	4388	**3579**	**28**
NB12433	19	1137	33	18	31	0	4609	21	33	0	4907	**3551**	**29**
NB12408	17	1412	37	19	31	0	5041	22	26	0	4129	**3527**	**30**
NB09441	20	1063	31	18	34	0	5083	21	30	0	4420	**3522**	**31**
NB08428	22	1516	37	19	31	0	4687	23	30	2	4335	**3513**	**32**
NB11418	17	1481	37	19	30	0	4904	22	29	1	4128	**3504**	**33**
NB12440	19	1295	38	19	34	0	4544	27	32	0	4637	**3492**	**34**
NB11438	21	1360	42	18	32	0	4215	21	32	0	4857	**3477**	**35**
NB12417	17	1826	47	23	28	0	3899	27	28	2	4687	**3471**	**36**
NB12418	19	1165	45	17	31	0	4932	19	32	1	4169	**3422**	**37**
NB10409	19	1546	35	18	35	1	4124	20	32	1	4581	**3417**	**38**
P-721	19	1487	53	19	31	2	3494	22	29	3	4492	**3158**	**39**
NB12403	24	687	32	18	32	0	4240	22	33	0	4055	**2994**	**40**
Mean	**20**	**1532**	**43**	**19**	**32**	**0**	**4839**	**22**	**31**	**1**	**4751**	**3707**	
CV %	**7**	**17**	**22**	**1**	**4**	**252**	**7**	**1**	**5**	**126**	**9**		
LSD 5%	**2**	**368**	**13**	**1**	**2**	**1**	**516**	**2**	**3**	**3**	**673**		

Winter Barley Variety Trial (BVT) 2012 Summary for Lincoln and Mead, NE

VARIETY	Lincoln				MEAD				Across Locations	
	Anthesis	PHT	YLD	Rank*	Anthesis	PHT	YLD	Rank	YLD	Rank
	(after April1)	*Inch*	*lbs/a*		*(after April1)*	*Inch*	*lbs/a*		*Lbs/a*	
P-713	19	35	4784	15	24	35	5563	3	5173	7
P-721	21	31	3908	36	26	32	4786	25	4347	33
P-954	23	32	3218	39	25	32	4564	33	3891	39
TAMBAR 501	16	34	4772	17	21	35	5375	9	5073	11
NB08428	20	33	4332	27	23	34	5385	8	4859	18
NB09404	20	34	4732	18	24	36	5493	5	5113	9
NB09405	16	32	3668	38	22	35	4570	32	4119	36
NB09409	20	32	4608	21	25	35	5254	11	4931	15
NB09410	19	35	5216	5	23	37	5842	2	5529	2
NB09425	19	30	4811	14	25	32	5200	13	5006	13
NB09427	24	32	4185	30	27	35	5253	12	4719	24
NB09430	14	33	4064	32	21	37	4888	21	4476	28
NB09432	22	33	4083	31	26	35	4236	39	4160	35
NB09433	21	32	4242	29	26	34	4627	28	4434	31
NB09434	20	33	4295	28	25	32	4833	24	4564	25
NB09437	20	36	5321	3	24	36	6064	1	5692	1
NB09439	20	32	4636	19	24	33	4886	23	4761	21
NB09440	13	33	3935	34	21	35	4285	37	4110	37
NB09441	18	34	4903	12	21	36	5017	17	4960	14
NB10403	13	34	4951	9	21	38	4740	27	4846	19
NB10404	14	34	4556	22	21	35	4241	38	4399	32
NB10409	15	37	5023	8	22	38	4760	26	4892	16
NB10417	15	31	5077	6	21	35	5177	14	5127	8
NB10420	14	33	4774	16	21	36	5000	18	4887	17
NB10421	18	34	4934	11	24	35	4508	34	4721	23
NB10425	20	37	4951	9	25	35	5075	15	5013	12
NB10440	15	33	4891	13	22	35	5265	10	5078	10
NB10444	16	31	5536	1	21	35	5435	6	5486	3
NB11404	16	34	2848	40	21	35	3200	40	3024	40
NB11405	19	35	4516	23	25	37	4589	29	4552	26
NB11414	19	32	5488	2	23	35	4887	22	5188	6
NB11416	20	34	5035	7	24	35	5543	4	5289	5
NB11418	16	32	4611	20	22	33	4952	20	4782	20
NB11419	19	32	4335	26	22	34	4583	30	4459	29

NB11427	18	31	4033	33	22	33	4983	19	4508	27
NB11429	21	34	3782	37	23	33	4425	36	4104	38
NB11430	17	35	5219	4	21	36	5423	7	5321	4
NB11431	20	31	3911	35	25	31	4582	31	4247	34
NB11432	19	33	4398	25	24	34	4489	35	4443	30
NB11438	17	33	4459	24	22	35	5050	16	4755	22
Mean	**18.18**	**33.22**	**4526.1**		**23.10**	**34.68**	**4925.7**			
Coeff Var	**1.05**	**1.38**	**7.57**		**4.52**	**3.02**	**8.44**			
Root MSE	**1.47**	**1.38**	**342.45**		**1.05**	**1.05**	**415.61**			
R-Square	**0.91**	**0.68**	**0.81**		**0.81**	**0.78**	**0.70**			
LSD (p=0.05)	**1.71**	**2.37**	**556.66**		**1.69**	**1.70**	**675.58**			
P-value	**<0.0001**	**<0.0001**	**<0.0001**		**<0.0001**	**<0.0001**	**<0.0001**			

VI. ALLIED RESEARCH

The wheat breeding or variety development project is only one phase of wheat improvement research at the University of Nebraska-Lincoln. The project interacts and depends on research in wheat germplasm development, wheat quality, wheat nutritional improvement, wheat cytogenetics, plant physiology and production practices, and variety testing. Much of the production research is located at the research and extension centers. All components are important in maintaining a competitive and improving wheat industry in Nebraska. The allied research is particularly necessary as grain classification and quality standards change and as growers try to reduce their production costs.

The program also depends on interactions and collaborations with the Wheat Board, Nebraska Wheat Growers Association, regional advisory boards, Foundation Seeds Division, Nebraska Crop Improvement Association, the milling and baking industry, the malting and brewing industry, and other interested groups and individuals. The Nebraska Seed Quality Laboratory cooperates closely with the Wheat Quality Council to bake the large-scale cooperator samples. Ardent Mills also provides excellent milling and large loaf baking data to support our small loaf testing procedures. Numerous groups have visited the laboratory and participated in discussions on quality and marketing. Through these interactions, the program is able to remain focused and dedicated to being a premier provider of quality varieties, information, and technologies to help maintain the Nebraska Wheat Industry. We also wish to highlight the generosity of Mr. Martin Stumpf who recently donated one section of rainfed and irrigated land for an International Wheat Research Center in Grant, NE and the funds to build a building on the site. Grant is one of the finest wheat producing regions in Nebraska and this location will be a huge benefit to the Nebraska wheat producer. We hope our program will live up the high expectations of the donor.

VII. COMING AND GOINGS

All projects are more than crosses, selections, evaluations, data, and seed. At its heart, it is the people that make this research possible. Dr. Mary Guttieri completed her Ph.D. degree and continues to help the project immensely while working on a postdoc with Dr. Brian Waters. Ms. Caixia Liu and Mr. Javed Sidiqi joined the program as Ph.D. students. Dr. Hanaa Abouzeid joined the project as a Fulbright visiting scholar. We are extremely grateful for the excellent work that the team has and continues to do.

Summary:

In 2013-2014 season, 1,550,000 acres of wheat were planted in Nebraska and 1,450,000 were harvested with an average yield of 49 bu/a for a total production of 71,050,000 bu. This production was almost 180% higher than the 2012-2013 crop which bodes well for wheat producers. In 2012-2013 season, 1,470,000 acres of wheat were planted in Nebraska and 1,130,000 were harvested with an average yield of 35 bu/a for a total production of 39,550,000 bu. The 2012-2013 crop was one of the smallest crops in the last 50 years and certainly highlighted the effect of drought. In 2012, 1,380,000 acres of wheat were planted in Nebraska and 1,300,000 were harvested with an average yield of 41 bu/a for a total production of 53,300,000 bu. Despite continued genetic improvement, the main determinant in wheat production seems to be acres harvested, government programs, the price of corn, and weather (which also affects disease pressure and sprouting). This is an economic reality in understanding wheat yields and productivity in NE.

Using seed sales of certified seed, the top 10 lines grown in Nebraska in 2014 were: Settler CL (15.4%), Overland (12.4%), Tam 111 (9.4%), AP502CL2 (6.3%), Winterhawk (5.6%), Wesley (5.1%), Pronghorn (5.0%), Infinity CL (4.3%), Art (3.6%), and Camelot (3.3%). In 2014, NE05548 winter wheat was formally released and will be marketed as Husker Genetics Brand Panhandle, as was NT065427 winter triticale licensed to Ehmke Seeds . The decision to release Panhandle was made in 2013 so its description can be found in the 2013 report. The description of NT06427 is in this report. NT06427 was licensed to Ehmke Seeds and is expected to be marketed under the name Short Beard Thunder. A third line (NW07505) is being tested by and considered for release to our organic producers. The importance of certified seed is recognized by our growers and the best estimate of the Nebraska Crop Improvement Associatoin is that 78% of our planted seed is certified seed. Clearly the popularity of Clearfield® cultivars which require planting only certified seed help the use of certified seed. Four lines (NE07531, NE09517, NE09521, and NE10589) were advanced for possible release in 2015 or 2016. Of these, NE10589 is the most widely adapted and has the greatest potential.

Recent studies on nitrogen use efficiency (NUE) and on minerals identified Husker Genetics Brand Freeman as being particularly good for NUE, among the best lines available. As part of the NUE studies, we looked at mineral content in wheat grain. The original intent of doing mineral analyses was that we were concerned we may be misclassifying winter wheat varieties as having low NUE when in fact they were mineral deficient. We discovered that there is genetic variation for cadmium (Cd, a harmful heavy metal) in Great Plains hard red winter wheat. Interestingly, the recently released Panhandle winter wheat is a low Cd accumulation wheat. As it is a common parent in our breeding program, we will develop additional low Cd varieties in the future. Breeding environmentally sustainable small grains with better health benefits will a major thrust of our program and for the good of the Wheat Industry as a whole. It will also position us well in the emerging flex crop/cover crop market where blends of crops are used to meet environmental and farm goals.

Our hybrid wheat efforts have greatly increased with the hiring of two graduate students to work on this project. While the public sector may never release a hybrid wheat variety, we are committed to developing the fundamental knowledge that will be useful in developing hybrid wheat as a commercial product in the future. Hybrid wheat is one of the most promising ways of bringing the increased productivity and technology to wheat that is needed to feed an ever increasing and wealthier world. Even if hybrid wheat may be years away, the knowledge on heterosis (hybrid vigor) will be extremely valuable to our conventional breeding program as it will allow us for the first time to truly look at the performance and genetics of hybrid crosses. Nor should we overlook the potential of adding numerous elite by elite populations to our conventional breeding efforts.

As part of the people's university, we continue to breed wheat suitable for all of our constituencies. Due to reduced funding, our organic wheat efforts have lessened, but we are committed to working with organic producers. We have released a new forage triticale and have numerous potential releases in the pipleline. Our barley breeding effort remains strong. Both triticale and barley are excellent alternative crops to wheat if there is a catastrophic event in wheat. For example barley is immune to karnal bunt should it return to the Great Plains.

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

U.S. Wheat Associates
Trade Team List for 2015
March 27, 2015

Team Designation	Activity #	Number of Travelers	Potential States Visited	Period of Travel
Japanese Executive Millers Team	F15GX05001	6 + 1 staff	OR, WA and MT	April 29-May 8, 2015 Confirmed
European Trade Team	F15GX06003	8 + 1 staff	ND, MN and OH	21-27, 2015 Confirmed
South African Crop Quality Team	F15GX10002	1 + 1 staff	CO and OK	June 7-13, 2015 Confirmed
Nigerian Trade Mission	F15GX10003	8 + 2 staff	SD and KS	June 21-27, 2015 Confirmed
Japanese Zen-Fun Millers Group	O15GX05001	4 + 1 staff	ID, WA and OR	July 5-11, 2015 Proposed
USW SUMMER BOARD MEETING			**SAN DIEGO, CALIFORNIA**	**JULY 12-15, 2015**
Peruvian Trade Team	O15GX02007	4 + 1 staff	DC, VA, CO and Kansas City	July 19-25, 2015 Confirmed
Algerian Trade Team			DC, MN and ND	July 26-August 1, 2015 Proposed
Caribbean Trade Team	M15GX01015	5 + 1 staff	ND, KS and St Charles, LA	August 16-22, 2015 Proposed
Korean Wheat Crop Survey Team	F15GX05204	4 + 1 staff	OR, WA and MT	July 27-August 1, 2015 Confirmed
Philippine Trade Team	F15GX03154	5 + 1 staff	ND, MT, ID, WA, and OR	August 2-12, 2015 Confirmed
USW WORLD STAFF CONFERENCE			**ANTIGUA, GUATEMALA**	**AUGUST 29 - SEPTEMBER 3, 2015**
Taiwanese Goodwill Mission	F15GX05311	3 + 1 staff	DC, ID, MT and OR	September 12-23, 2015
Japanese Mid-Level Management Team	F15GX05005	6 + 1 staff	OR, WA and MT	October 4-10, 2015 Confirmed

Asia Teams, in red, are managed by USW/Portland.

This initial trade team listing reflects only the plans laid out in the 2015 UES, which was written a year ago in January 2014.
During the next few months, the overseas directors will finalize dates and schedules, making this list a preliminary draft only.