2014 Agricultural Research Update

NDSU Williston Research Extension Center

Williston, ND

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MSU Eastern Agricultural Research Center

Sidney, MT

Serving the Mon-Dak Region





Regional Report No. 20 – December 2014

Off-Station Cooperators – Producers – CES Agents

MONTANA

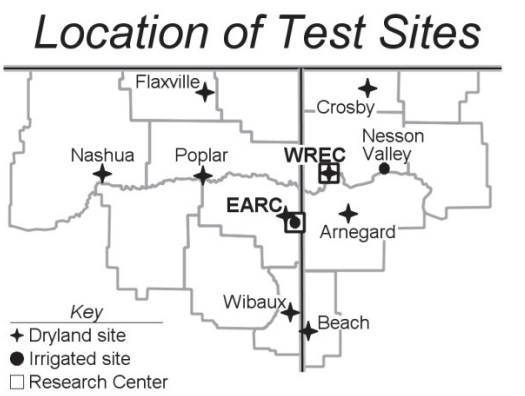
SMALL GRAIN:
Flaxville – Dave Roos – Agent Bobbie Roos
Nashua – Bill Lauckner – Agent Shelley Mills
Poplar – Mark Swank – Agent Ann Ronning
Wibaux – Rick Miske– Agent Dave Bertelsen

SUGARBEET:
East Fairview – Phillip Hurley
East Fairview – Rodney Hurley

NORTH DAKOTA

SMALL GRAIN AND BROADLEAF:
Crosby – Harlan Johnson – Agent Keith Brown
Beach—Tim Oech—Agent Ashley Ueckert

BROADLEAF:
Arnegard—Kirk Olson—Agent Karla Ryan



We would like to take this opportunity to thank the County Agents, the County Ag Improvement Associations and especially the farm operators who permit the location of off-station plots on their land. ***All are to be commended for their cooperative efforts in helping determine crops and variety performance in the MonDak region.***

Results from tillage, chemical fallow, and field scale no-till trials, as well as other management trials on dryland and irrigated crops can be obtained by visiting with Center personnel.

Disclaimer: The information given herein is for educational purposes only. Any reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement is implied by the Williston Research Extension Center or the Eastern Agricultural Research Center.

Diana Amiot, WREC Research Specialist-Crop Production harvesting corn with the new Zuern plot combine.

DISEASE FOCUS
White Mold (Sclerotinia stem rot)

White mold is a common disease caused by the fungus *Sclerotinia sclerotiorum*. The fungus has an extensive host range of more than 300 plant species and causes diseases on a wide variety of crops such as sunflower, dry bean, soybean, canola, potato, alfalfa, mustard, safflower, lentil, flax, field peas and many garden vegetables. The fungus that causes white mold on one crop is the same one that causes white mold or Sclerotinia disease on any of other crops listed above. *Sclerotinia sclerotiorum* overwinters principally as sclerotia in soil. The sclerotia germinate to form small tan to brown mushrooms called apothecia (about one-eighth to one-fourth inch in diameter). These produce spores termed ascospores which initiate the disease on soybean and other susceptible crops. (Nelson, Berlin. Plant Pathologist NDSU)

Importance of this disease

White mold was selected as a disease to keep an eye on because of the increased acres of host crops (i.e. soybeans) in the region. The WREC in collaboration with Dr. Michael Wunsch, plant pathologist from Carrington REC, have begun extensive work in managing white mold in some of these host crops. White mold is not a new disease but is relatively unknown in this region and its impacts, so the questions have started to be asked: How do we identify it and what are the important things to know about white mold? The picture to the right identifies white mold on the stem of a soybean. This will kill the plant and the sclerotia bodies will form inside the stem, creating sclerotia that persist in the soil for years to come.

Management

Understanding the disease and management are important first steps. Some of the most important controls for Sclerotinia stem rot of soybean are variety selection and cultural practices that lessen disease severity. Cultural practices that have been shown to reduce disease severity include: 1) wider row-spacing to help minimize/reduce prolonged wetness and the favorable conditions for sclerotia to germinate. 2) Manage irrigation to avoid over irrigating and prolonged wetness to the dense canopy which is favorable for disease development. 3) Fungicide application and timing can provide some protection to minimize disease severity, but will not completely control or prevent the disease. (NDSU Plant Disease management Guide PP-622) 4) Crop rotation that rotates between crops that are host to Sclerotinia if the disease becomes evident.

Recognition of the disease is an important first step. The picture (soybean field) to the right illustrates the disease symptoms in the top leaves. If you see this, open up the canopy and look at the stem below. It will look similar to the picture above. At this stage there are no effective measures to control the disease, but minimizing disease severity can be obtained using cultural practices 2 and 3. The previous two summers have been optimal conditions in early August for disease development. The picture below shows soybeans that were completely destroyed by Sclerotinia.

The purpose of this page was to create awareness of a disease that has been observed by a few of the producers adding soybeans to their rotation and not to discourage them. Like any other plant disease, managing it is very important and this is one I have received the most questions on this past year, so the WREC will continue to work towards providing answers to those questions. If you have questions please feel free to contact me, Tyler Tjelde, at the Williston Research Extension Center.

Upcoming Events for 2015

January 5th	Diversity Direction and Dollars-Dickinson, Ramada Grand Dakota Lodge
January 5th-7th	Manitoba-North Dakota Zero Till Conf. - Dickinson, Ramada Grand Dakota
January 7th	Greenhouse, Ornamental, and Turf Recertification - Williams County Extension
January 13th-14th	Winter Ag Expo- Jamestown, Civic Center
January 14th	New Trends in Agriculture - Glasgow, Cottonwood Inn
January 16th-17th	MonDak Ag Days - Sidney, Richland County Event Center
January 20th-21st	2015 NDSU Feedlot School-Carrington Research Extension Center
January 26th-27th	Northern Pulse Growers Assoc. Conference-Minot, Riverside Holiday Inn
January 28th-30th	Ag Expo-Minot, North Dakota State Fair Center
February 2nd-3rd	National Hard Spring Wheat Show - Williston, Grand Williston Hotel
February 6th-7th	2015 NDFMGA & Local Foods Conference-Minot, Grand International Hotel
February 10th-11th	Agri International Trade Show-Bismarck, Bismarck Convention Center
February 10th- 11th	Advanced Crop Advisers Workshop-Fargo
February 13th-14th	GATE - Glendive, Eastern Plains Event Center
February 17th	MonDak Pulse Day – Williston Research Extension Center
March 2nd	Farming for the Bottom Line-Bismarck, Bismarck State College
March 3rd- 4th	Western Crop/Pest Management School-Mandan, Best Western, Seven Seas
March 10th-11th	KUMV-TV Farm & Ranch Showcase - Williston, Raymond Center
March 12th	Pesticide Recertification-Williston Research Extension Center
March 18th	Commercial Fumigation Recertification-Williams County Extension
July 9th-10th	MonDak Ag Showcase - Williston
July 9th	Williston Research Extension Center Field Day-Williston
July 10th	Nesson Valley Irrigation Field Day-Nesson Valley
July 14th	Eastern Ag Research Center Field Day-Sidney
July 17th- 25th	North Dakota State Fair- Minot

Table of Contents

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MONTANA STATE UNIVERSITY
MONTANA AGRICULTURAL EXPERIMENT STATION

MONTANA STATE UNIVERSITY
EXTENSION

NDSU
North Dakota State University
ND Agricultural Experiment Station

NDSU
Extension Service
North Dakota State University

Weather Information

Weather Summary Sidney, MT

Month	Precipitation 2014	Precipitation Avg	Temperature 2014	Temperature Avg	*
	- inches -		- degrees F -		
Oct-Dec. 2013	2.07	1.90			
January-March	0.49	1.30			
April	1.62	1.15	42.6	44.6	0
May	3.55	2.19	58.0	56.1	1
June	1.11	2.76	62.2	64.5	0
July	0.47	2.09	68.2	70.1	7
August	5.17	1.48	68.5	68.8	6
September	1.13	1.24	57.8	58.0	3
April-July	6.75	8.19			
April-Sept	13.05	10.91			
Total-October 13-Sept 14	15.61	14.11			

*Number of Days over 89° F

Last Spring Frost – May 15, 2014 (31.0° F)

First Fall Frost – September 12, 2014 (29° F)

Weather Summary Williston, ND

Month	Precipitation 2014	Precipitation Avg	Temperature 2014	Temperature Avg	*
	- inches -		- degrees F -		
Oct-Dec. 2013	2.78	1.76			
January-March	1.08	1.20			
April	1.45	1.17	42.0	46.0	0
May	1.32	2.26	56.0	57.0	0
June	1.59	2.69	63.0	65.0	0
July	0.83	2.22	70.0	72.0	12
August	3.28	1.59	70.0	71.0	8
September	1.01	1.32	59.0	60.0	4
April-July	5.19	8.34			
April-Sept	9.48	11.25			
Total-Oct 13 - Sept14	13.34	14.21			

*Number of Days over 89° F

Last Spring Frost – May 16, 2014 (28° F)

First Fall Frost – September 12, 2014 (31° F)

Off-Station Precipitation* Montana

Site	April	May	June	July	Aug	Total
Flaxville	1.33	2.07	3.51	2.06**	4.01	12.98
Nashua	0.93	1.40	2.26	0.58	6.72	11.89
Poplar	0.28	1.24	1.33	0.46	5.07	8.38
Wibaux	1.95	2.58	2.85	1.16	7.11	15.65

*Actual rainfall received at plot location may have been more or less.

"Sometimes we have winter all summer and summer all winter. It's mighty regular about not raining, though."

-Unknown

Off-Station Precipitation* North Dakota

Site	April	May	June	July	Aug	Total
Beach	1.15	3.42	2.59	0.98	4.63	12.77
Crosby	1.41	2.24	5.12	1.23	2.41	12.41
Nesson Valley^	1.13	1.29	2.42	1.33	2.43	8.60
Watford City	1.11	2.94	2.24	0.71	2.55	9.55

*Actual rainfall received at plot location may have been more or less.
^ Hail damage occurred September 3, 2014

"If the rain spoils our picnic, but saves a farmer's crop, who are we to say it shouldn't rain?"

-Tom Barrett

Nesson Valley Tillage Study

All experiments are statistically designed so that the “real” yield differences can be separated from yield differences that occur by chance. LSD (Least Significant Difference) values are used for this purpose. When comparing the yield of another variety, the yield difference must exceed the LSD value (higher or lower) to be considered a “real” difference. It is advisable to use multi-year averages when choosing a variety or cropping sequence.

Spring Wheat Variety Plots at Nesson Valley

HARD SPRING WHEAT VARIETY DESCRIPTIONS

Variety	Origin[1]	Height	Maturity	Resistance to[2]						Quality Factors	
				Lodging	Stem Rust	Leaf Rust	Foliar Disease	Head Scab	Sawfly	Test Weight	Grain Protein
Advance	SDSU	M SHORT	M EARLY	MS	MR	MR	NA	MS	NA	M HIGH	M HIGH
Agawam (HWSW)	WB	SHORT	EARLY	MR	NA	A	NS	MS	R	M HIGH	M LOW
Alpine (HWSW)	AgriPro	MEDIUM	MEDIUM	M	R	S	M	MR	S	MEDIUM	M LOW
Alsen	NDSU	MEDIUM	M EARLY	MR	R	MR/MS	S	MR	S	MEDIUM	M HIGH
AP 604 CL*	AgriPro	MEDIUM	M EARLY	MS	R	MS	MS	NA	S	HIGH	MEDIUM
Barlow	NDSU	MEDIUM	M EARLY	M	R	MR/MS	MR	M	S	M HIGH	M HIGH
Breaker	WB	MEDIUM	MEDIUM	MR	R	MR	MS	M	S	M HIGH	M HIGH
Brennan	AgriPro	SHORT	M EARLY	MR	R	MR	M	MS	S	MEDIUM	MEDIUM
Briggs	SDSU	M TALL	M EARLY	MS	R/MR	MR/MS	MS	M	S	MEDIUM	MEDIUM
Buck Pronto	TS	M SHORT	EARLY	R	R	MR	NA	NA	S	MEDIUM	MEDIUM
Choteau	MSU	M SHORT	M LATE	MS	R	MR/MS	MR	S	R	MEDIUM	MEDIUM
Corbin	WB	MEDIUM	MEDIUM	M	NA	NA	NA	NA	MR	MEDIUM	MEDIUM
Dapps	NDSU	MEDIUM	MEDIUM	MR	R	M	NA	S	NA	MEDIUM	HIGH
Duclair	MSU	MEDIUM	MEDIUM	R	R	NA	NA	NA	R	MEDIUM	MEDIUM
Egan[3]	MSU	MEDIUM	M LATE	R	NA	NA	NA	NA	S	HIGH	M HIGH
Elgin-ND	NDSU	TALL	MEDIUM	M	R	MS	NA	M	S	M LOW	LOW
Faller	NDSU	M TALL	MEDIUM	M	R	S	MR	M	S	MEDIUM	LOW
Forefront	SDSU	TALL	EARLY	M	MR	MR	NA	MR	S	M LOW	HIGH
Freyr	AgriPro	MEDIUM	MEDIUM	M	R	MR/MS	MS	MR	S	MEDIUM	M LOW
Glenn	NDSU	M TALL	M EARLY	MR	R	MR/MS	M	MR	S	HIGH	M HIGH
Howard	NDSU	M TALL	MEDIUM	MS	R	MS	M	M	S	M LOW	M LOW
Jedd*	WB	M SHORT	EARLY	R	NA	NA	NA	NA	S	HIGH	LOW
Jenna	AgriPro	M SHORT	M LATE	MR	R	MR/MS	M	M	S	M LOW	M LOW
Kelby	AgriPro	SHORT	MEDIUM	MR	MR	MR/MS	M	M	S	M HIGH	MEDIUM
LCS Albany	Limagrain	M SHORT	LATE	M	MR	MR	MS	M	S	M HIGH	M LOW
LCS Breakaway	Limagrain	M SHORT	M EARLY	M	NA	R	MS	M	S	M HIGH	MEDIUM
LCS Iguacu	Limagrain	SHORT	LATE	R	NA	NA	MR	MR	S	M HIGH	M LOW
LCS Powerplay	Limagrain	MEDIUM	MEDIUM	M	NA	MR	MS	M	S	LOW	M LOW
Linkert	MN	M SHORT	M EARLY	R	R	MR	NA	M	NA	MEDIUM	HIGH
McNeal	MSU	MEDIUM	MEDIUM	M	MS	MS	M	VS	S	M LOW	MEDIUM
Mott	NDSU	TALL	M LATE	M	MR	S	MS	MS	R	MEDIUM	MEDIUM
ND901CL Plus*	NDSU	TALL	MEDIUM	M	R/MR	MR	NA	M	S	M HIGH	HIGH
Norden	MN	M SHORT	M LATE	MR	R	R/MR	M	M	NA	LOW	M HIGH
ONeal	WB	MEDIUM	M LATE	R	NA	MS	MR	S	S	MEDIUM	M LOW
Prestige	Pulse USA	MEDIUM	M EARLY	MR	NA	NA	NA	NA	S	MEDIUM	MEDIUM
Prevail	SDSU	M SHORT	EARLY	M	NA	NA	NA	M	NA	HIGH	M HIGH
Prosper	NDSU	MEDIUM	MEDIUM	MR	R	S	M	M	S	MEDIUM	M HIGH
RB07	MN	M SHORT	M EARLY	M	R	R	MS	MR	S	M HIGH	MEDIUM
Redstone	Pulse USA	SHORT	M LATE	R	NA	R	NA	MR	MA	M LOW	MEDIUM
Reeder	NDSU	MEDIUM	MEDIUM	MR	R	MS	S	S	S	MEDIUM	MEDIUM
Rollag	MN	MEDIUM	MEDIUM	MR	R	MS	MR	MR	NA	M HIGH	M LOW
Sabin	MN	MEDIUM	MEDIUM	M	R	MR	MS	M	NA	M HIGH	MEDIUM
Samson	WB	SHORT	MEDIUM	R	R	MR/MS	MS	S	S	LOW	LOW
Select	SDSU	MEDIUM	M EARLY	M	R/MR	R/MR	R/MR	MR	NA	MEDIUM	MEDIUM
Steele-ND	NDSU	MEDIUM	MEDIUM	MS	R	R	MS	M	S	MEDIUM	MEDIUM
SY Ingmar	Syngenta	MEDIUM	MEDIUM	R	MR	MR	MS	MR	S	M HIGH	M HIGH
SY Rowyn	Syngenta	M SHORT	M EARLY	R	MR	MR	NA	MR	S	M HIGH	M LOW
SY Soren	Syngenta	M SHORT	M EARLY	R	R	MR	M	M	S	M HIGH	MEDIUM
SY Tyra	Syngenta	M SHORT	MEDIUM	R	R	MR	MS	S	R	MEDIUM	M LOW
SY605CL*	Syngenta	MEDIUM	M EARLY	MS	R/MR	MR/MS	MS	S	S	M LOW	HIGH
Vantage	WB	M SHORT	LATE	R	MR	MR/MS	MS	MS	S	HIGH	HIGH
Velva	NDSU	M SHORT	M LATE	R	R	MR/MS	M	MS	S	MEDIUM	MEDIUM
Vida	MSU	MEDIUM	MEDIUM	MR	MS	MS	MR	S	MR	MEDIUM	MEDIUM
Volt	WB	MEDIUM	M LATE	R	NA	MR	MR	MS	S	HIGH	LOW
WB9879CLP*	WB	MEDIUM	MEDIUM	R	S	S	MR	MS	R	MEDIUM	HIGH
WB-Digger	WB	MEDIUM	MEDIUM	M	MR	MR/MS	NA	MS	S	M LOW	LOW
WB Gunnison	WB	MEDIUM	M EARLY	R	NA	S	S	S	T	M HIGH	MEDIUM
WB Mayville	WB	SHORT	M EARLY	R	R	MR/MS	MS	S	S	M HIGH	M HIGH

[1] Refers to developer: MN = University of Minnesota; MSU = Montana State University; NDSU = North Dakota State University; SD = South Dakota State University; TS = Tigren Seed; WB = WestBred.

[2] R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible; NA = data not available.

[3] Resistant to orange wheat blossom midge.

* Clearfield wheat with imidazolinone tolerance.

Sprinkler Irrigated Spring Wheat
Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	3 yr	2014	2014	3 yr
Reeder	113.6	76.1	60.0	14.1	15.4
Oneal	115.2	74.2	59.5	13.4	14.6
SY605CL	106.3	72.1	60.0	15.4	16.0
Mott	113.1	72.0	59.0	14.3	15.0
Vida	104.0	71.9	58.5	13.8	14.7
McNeal	97.5	71.6	59.0	14.0	14.9
SY Tyra	105.2	71.2	59.0	12.9	14.1
Brennan	100.1	70.6	60.0	14.6	15.7
Duclair	110.2	70.0	59.0	13.4	14.8
WB-Gunnison	103.9	68.9	59.5	13.4	14.1
SY Soren	106.7	67.5	60.5	14.0	15.4
Choteau	101.4	65.5	58.5	14.1	15.2
Jedd	89.6	65.1	59.5	13.5	14.8
Volt	119.0	64.9	61.5	13.1	14.4
Buck Pronto	105.5	64.4	60.0	14.8	16.2
Corbin	96.2	64.0	59.5	13.8	15.0
Thatcher	71.6	53.7	58.0	14.3	15.0
Fortuna	81.5	53.6	58.5	14.5	15.4
Redstone	113.3	--	59.5	12.0	--
Albany	112.0	--	59.5	11.5	--
Prosper	111.4	--	59.5	12.5	--
Velva	110.7	--	59.0	13.1	--
SY Rowen	110.3	--	60.0	13.3	--
Elgin	107.1	--	59.5	14.0	--
SY Ingmar	105.3	--	60.5	14.3	--
WB9879CL	104.4	--	59.0	14.4	--
Iguacu	102.2	--	59.0	11.9	--
Prestige	101.3	--	59.0	13.4	--
Egan	101.0	--	58.0	15.8	--
Barlow	97.8	--	62.0	14.8	--
LSD 5%	10.5				

Planted: May 8 **Harvested:** Aug 27
Previous Crop: Safflower

Dryland Fallow Spring Wheat
Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	3 yr	2014	2014	3 yr
Brennan	48.9	46.3	61.5	11.6	13.8
Reeder	46.0	45.4	62.5	10.9	13.5
Vida	49.6	45.2	61.0	10.1	13.4
SY Soren	46.6	44.7	60.5	10.9	13.9
Oneal	45.3	42.6	61.5	10.5	13.2
SY Tyra	42.1	41.1	62.0	9.8	12.6
Jedd	46.0	40.3	62.0	10.3	13.0
Choteau	39.2	39.9	60.5	11.8	13.6
Duclair	45.1	39.4	60.0	11.0	12.9
SY605 CL	39.5	39.1	62.0	11.3	14.5
Fortuna	42.6	38.2	61.0	11.9	13.8
Mott	39.1	37.9	61.5	11.6	14.0
McNeal	42.8	37.8	60.0	10.6	13.7
Prosper	37.3	37.4	61.0	10.3	13.5
Corbin	31.1	37.3	61.0	10.9	13.3
Volt	40.6	35.6	62.0	10.3	13.7
WB-Gunnison	28.3	33.8	61.0	10.9	13.0
Buck Pronto	21.5	31.2	58.5	12.1	14.8
Thatcher	33.5	31.1	59.0	11.2	13.6
SY Rowyn	51.4	--	60.0	11.0	--
SY Ingmar	44.9	--	61.5	11.6	--
Elgin	42.9	--	60.0	11.8	--
Powerplay	38.9	--	61.0	9.8	--
Iguacu	37.8	--	61.0	10.1	--
Velva	37.5	--	61.0	11.4	--
Barlow	34.2	--	63.0	11.8	--
Egan	33.7	--	60.5	12.2	--
WB9879CL	32.6	--	60.5	12.4	--
Redstone	32.5	--	59.0	11.0	--
Prestige	32.5	--	60.0	11.0	--
LSD 5%	7.3				

Planted: Apr 24 **Harvested:** Aug 13

Joyce Eckhoff,

EARC
Agronomy
Superintendent

Speaking
during EARC
Field Day

Dryland Recrop Spring Wheat
Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	3 yr	2014	2014	3 yr
Vida	40.9	30.8	60.0	10.7	13.5
Reeder	36.9	29.7	61.5	12.3	14.1
SY Tyra	40.7	28.3	62.0	10.8	13.1
McNeal	32.4	27.5	58.5	12.3	13.9
Mott	37.6	27.5	60.0	13.7	15.5
Choteau	37.3	27.2	59.0	12.7	13.7
Duclair	35.6	26.9	59.0	11.1	13.3
Prosper	32.2	24.6	59.5	11.8	13.9
Brennen	41.6	--	61.0	12.9	--
WB9879CLP	41.4	--	60.0	12.6	--
Velva	38.5	--	60.0	12.5	--
Elgin	34.8	--	59.0	12.2	--
Egan	34.4	--	58.0	13.6	--
Barlow	27.9	--	62.5	13.4	--
LSD 5%	5.3				

Planted: Apr 23 **Harvested:** Aug 14
Previous Crop: Peas

Spring Wheat, Dryland Fallow
Flaxville, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	2 yr	2014	2014	2 yr
Velva	58.7	43.2	60.0	13.4	12.1
Reeder	55.1	39.9	60.5	14.4	12.5
McNeal	56.1	39.0	59.0	14.0	12.5
Choteau	54.3	36.8	59.0	13.3	12.1
SY Tyra	49.3	36.2	59.5	12.8	11.9
Elgin	50.4	35.7	60.0	14.0	12.1
Duclair	50.9	35.3	59.0	13.4	12.1
WB9879CLP	50.2	34.6	58.5	13.0	11.9
Prosper	49.3	34.6	60.0	13.2	12.3
Mott	45.1	34.5	59.5	13.6	12.8
Vida	45.2	33.3	59.5	13.7	12.2
Barlow	37.9	--	65.5	14.3	--
Egan	35.1	--	57.0	15.0	--
Brennen	35.0	--	59.5	13.7	--
LSD 5%	10.8				

Planted: May 21 **Harvested**: Sep 12

Spring Wheat, Dryland Recrop
Wibaux, MT

	Yield bu/a	TW lb/bu	Protein %
Cultivar	2014	2014	2014
WB9879CLP	56.3	57.0	14.4
SY Tyra	65.9	59.0	12.6
Egan	50.3	56.0	15.5
Mott	54.4	58.5	13.7
Barlow	54.0	61.5	13.7
McNeal	57.5	57.0	13.1
Brennen	47.8	59.0	15.2
Elgin	51.3	57.5	14.0
Velva	58.3	58.5	12.5
Vida	53.4	59.0	11.3
Choteau	53.1	58.0	12.1
Reeder	52.6	59.5	12.5
Prosper	51.3	59.0	11.2
Duclair	49.7	57.0	12.1
LSD 5%	10.1		

Planted: May 22 **Harvested:** Sep 16
Previous Crop: Lentils

"I would rather be on my farm, than be emperor of the world."

-George Washington

"Farming looks mighty easy when your plow is a pencil, and you're a thousand miles from the corn field."

-Dwight D. Eisenhower

Dryland Fallow HRS Wheat
Poplar, MT

Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Protein % 2014	Protein % 3 yr
Vida	55.3	60.1	56.0	14.2	14.6
Reeder	54.6	60.0	56.0	15.4	15.3
SY Tyra	50.0	57.3	55.0	14.8	14.2
Mott	51.3	56.7	56.0	15.4	15.4
McNeal	49.7	56.6	54.5	15.4	15.7
Duclair	53.9	56.2	54.5	14.3	14.8
Choteau	51.8	56.0	54.5	14.9	15.4
Prosper	42.0	55.2	55.5	14.0	14.3
Elgin	59.3	--	55.0	14.9	--
Brennan	58.8	--	58.5	14.4	--
Velva	55.3	--	55.5	14.5	--
Barlow	51.4	--	60.5	14.5	--
WB9879CLP	50.9	--	55.5	14.8	--
Egan	50.0	--	55.0	15.4	--
LSD 5%	5.9				

Planted: May 21 **Harvested:** Sep 12

Dryland Fallow HRS Wheat
Nashua, MT

Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Protein % 2014	Protein % 3yr
Vida	49.8	41.3	55.5	13.1	13.8
Prosper	49.8	40.9	54.5	13.2	13.6
SY Tyra	51.7	39.6	55.5	13.7	13.4
McNeal	60.1	38.7	53.5	14.0	14.6
Reeder	47.3	37.7	55.5	14.5	14.7
Mott	37.7	36.8	54.5	14.8	14.7
Choteau	41.2	33.9	52.5	15.3	15.5
Duclair	40.8	31.6	53.0	14.3	14.6
Elgin	54.8	--	54.0	14.8	--
Velva	51.9	--	54.5	15.0	--
Brennan	45.6	--	57.0	14.8	--
Barlow	44.7	--	59.0	13.5	--
Egan	43.9	--	54.0	15.8	--
WB9879CLP	39.4	--	53.5	14.9	--
LSD 5%	12.4				

Planted: May 23 **Harvested:** Sep 15

"Life on a farm is a school of patience; you can't hurry the crops or make an ox in two days."

-Henri Alain

Irrigated Hard Red Spring Wheat Values
Sidney, MT

Cultivar	Yield bu/a 3 yr	TW lb/bu 3 yr	Protein % 3 yr	$/a + or - Vida
Reeder	76.1	59.4	15.4	77.19
SY605CL	72.1	59.6	16.0	58.90
Brennan	70.6	59.9	15.7	31.90
Mott	72.0	59.1	15.0	12.49
Oneal	74.2	58.3	14.6	11.14
McNeal	71.6	57.8	14.9	8.60
Vida	71.9	58.0	14.7	0.00
SY Soren	67.5	59.3	15.4	-10.19
Duclair	70.0	57.2	14.8	-18.39
Buck Pronto	64.4	58.3	16.2	-21.72
SY Tyra	71.2	59.7	14.1	-39.53
Choteau	65.5	57.3	15.2	-40.99
WB-Gunnison	68.9	59.0	14.1	-60.73
Jedd	65.1	59.2	14.8	-65.82
Corbin	64.0	58.5	15.0	-66.23
Volt	64.9	58.7	14.4	-77.42
Fortuna	53.6	57.6	15.4	-151.41
Thatcher	53.7	56.6	15.0	-167.58

Wheat prices summarized by P. Lamb, NARC, Havre, MT, from 4-yr (2010-2013) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee

Dryland Hard Red Spring Wheat Values
Sidney, MT

Cultivar	Yield bu/a 3 yr	TW lb/bu 3 yr	Protein % 3 yr	$/a + or - Vida
Brennan	46.3	60.8	13.8	14.76
SY Soren	44.7	59.2	13.9	9.21
Reeder	45.4	60.2	13.5	1.51
Vida	45.2	58.7	13.4	0.00
Oneal	42.6	59.7	13.2	-25.51
SY605 CL	39.1	59.8	14.5	-26.32
Choteau	39.9	59.3	13.6	-39.85
Mott	37.9	59.3	14.0	-43.9
Fortuna	38.2	59.3	13.8	-47.29
Jedd	40.3	60.3	13.0	-48.53
McNeal	37.8	58.0	13.7	-50.35
Duclair	39.4	57.8	12.9	-55.04
SY Tyra	41.1	60.3	12.6	-55.08
Prosper	37.4	59.7	13.5	-58.65
Corbin	37.3	59.2	13.3	-64.63
Volt	35.6	60.0	13.7	-67.2
Buck Pronto	31.2	57.5	14.8	-86.24
WB-Gunnison	33.8	59.5	13.0	-95.52
Thatcher	31.1	57.7	13.6	-106.03

Wheat prices summarized by P. Lamb, NARC, Havre, MT, from 4-yr (2010-2013) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee

Dryland Notill Spring Wheat
Williston, ND

	Yield^		TW	Protein*	
	bu/a		lb/bu	%	
Cultivar	2014	3 yr	2014	2014	3 yr
Prevail	43.0	41.5	59.5	14.5	14.1
Vida	46.4	41.0	59.6	14.3	14.8
Forefront	45.7	40.5	61.0	14.4	13.9
LCS Powerplay	41.2	40.2	60.5	14.8	14.2
Velva	45.8	39.6	59.5	14.9	15.3
Jenna	41.8	38.7	59.1	14.3	15.4
RB07	43.4	38.4	61.1	15.0	15.2
Brennan	42.3	37.8	61.3	15.5	15.6
Elgin-ND	41.1	37.3	59.1	15.4	16.0
Samson	41.3	37.3	59.7	14.5	14.1
Kelby	38.7	36.6	61.4	15.3	15.8
LCS Breakaway	37.9	36.6	61.5	15.2	14.9
SY Tyra	42.2	36.5	61.5	14.3	15.1
Reeder	44.0	36.5	59.8	14.6	14.8
Norden	40.3	36.2	61.0	14.5	13.9
WB-Digger	42.2	36.2	59.0	14.5	14.0
Duclair	39.0	36.1	58.2	14.5	15.0
Breaker	40.0	36.0	61.5	14.8	14.4
Select	36.4	36.0	60.5	14.7	15.1
Freyr	42.3	35.8	60.5	14.5	15.3
Glenn	35.0	35.8	62.3	15.3	15.6
SY Soren	37.2	35.6	60.0	15.5	16.1
LCS Albany	43.1	35.4	58.8	14.4	15.0
Barlow	36.6	35.1	60.5	15.5	15.6
WB-Mayville	40.9	35.0	60.8	14.8	14.3
Prosper	40.3	35.0	58.1	15.3	15.3
Sabin	41.2	34.6	59.7	14.3	14.3
Faller	40.4	34.4	58.4	14.5	15.1
Choteau	36.9	34.3	59.6	15.9	16.1
Steele-ND	41.1	33.8	59.7	14.8	15.4
SY605CL	37.9	33.7	60.1	15.6	14.7
Vantage	39.0	33.6	61.1	16.1	15.5
Briggs	38.1	33.6	59.9	15.4	15.6
Mott	39.1	33.5	60.4	15.3	16.2
ND 901CL+	37.2	33.1	60.5	16.9	16.9
Advance	37.9	32.9	59.8	14.8	14.0
Howard	40.1	32.9	59.4	14.7	15.2
WB-Gunnison	40.5	32.4	60.1	14.3	14.7
Agawam (white)	36.2	32.4	61.7	13.2	13.3
Alpine (white)	46.2	--	59.6	15.8	--
SY Ingmar	44.6	--	59.6	14.0	--
LCS Pro	43.3	--	59.1	14.4	--
WB9507	43.0	--	60.8	14.1	--
LCS Nitro	42.5	--	59.0	14.5	--
Linkert	41.3	--	60.5	15.1	--
Alsen	41.3	--	60.2	13.9	--
Rollag	40.4	--	60.7	15.1	--
LCS Iguacu	40.1	--	57.4	15.4	--
Croplan HRS 3419	40.0	--	60.1	15.4	--
WB9879CLP	38.3	--	60.4	15.4	--
Croplan HRS 3361	37.4	--	57.3	14.2	--
Croplan HRS 3378	37.1	--	59.2	15.1	--
SY Rowyn	37.0	--	61.0	14.3	--
Dapps	32.2	--	57.9	16.9	--
LSD 10%	3.78	--	0.66	0.70	--

Planted: May 9 **Harvested:** August 12
Previous Crop: Green Peas
^ Reported on a 13.5% moisture basis
* Reported on a 12% moisture basis

Sprinkler Irrigated Hard Red Spring Wheat
Nesson Valley, ND

	Yield^		TW	Protein*	
	bu/a		lb/bu	%	
Cultivar	2014	3 yr	2014	2014	3 yr
LCS Albany	94.5	94.9	62.0	12.4	13.3
Jenna	98.9	93.0	61.4	12.6	13.8
Faller	97.3	90.6	61.9	12.5	13.8
Prosper	92.7	89.6	61.8	12.8	13.9
Vida	89.0	88.9	59.1	13.9	14.3
Barlow	98.7	88.5	63.1	13.2	14.5
Brennan	90.9	88.1	62.2	13.8	14.6
RB07	88.8	88.1	61.7	13.1	14.2
Reeder	90.5	87.1	61.4	13.7	14.4
Rollag	88.3	86.7	62.7	13.6	14.7
Steele-ND	101.1	86.6	62.6	13.3	14.6
Freyr	94.4	86.5	61.6	13.4	14.1
Kelby	91.2	86.0	62.4	14.3	14.9
SY Soren	94.9	85.9	61.8	13.4	14.6
Howard	96.5	85.7	62.4	12.9	14.4
Mott	96.4	85.6	62.4	14.0	15.0
Glenn	94.6	84.2	64.9	13.6	14.7
ND 901CL Plus	91.6	82.2	61.8	14.3	15.3
Duclair	85.8	79.0	59.3	13.6	13.9
Velva	102.4	--	60.9	12.7	--
LCS Iguacu	102.1	--	62.9	12.0	--
LCS Powerplay	98.1	--	62.0	12.5	--
Linkert	94.9	--	61.7	14.4	--
Briggs	92.7	--	61.7	14.0	--
Elgin-ND	88.5	--	62.0	13.4	--
LCS Breakaway	84.0	--	62.7	13.6	--
Vantage	76.3	--	62.9	15.5	--
LSD 10%	9.2	--	0.7	0.6	--

Planted: May 13 **Harvested:** August 19
Previous Crop: Soybean
^ Reported on a 13.5% moisture basis
* Reported on a 12% moisture basis

Fast Facts About Agriculture

- *There are approximately 2.2 million farms in America. 97% of those farms are operated by families (individuals, family partnerships, or family corporations).*
- *Farm and ranch families comprise just 2% of the U.S. population.*
- *Today's farmers produce 262% more food with 2% fewer inputs (labor, seeds, feed, fertilizer, etc.) than they did in 1950.*
- *Farmers and ranchers receive only 16 cents out of every dollar spent on food at home and away from home. The rest goes for production, processing, marketing, transportation, and distribution.*

Dryland Notill Spring Wheat
Crosby, ND

	Yield^		TW	Protein*	
	bu/a		lb/bu	%	
Cultivar	2014	3 yr	2014	2014	3 yr
Jenna	41.2	55.9	55.9	13.0	13.9
Barlow	34.4	55.2	56.7	15.3	15.3
RB07	34.5	55.0	56.5	14.2	15.0
Glenn	36.0	54.6	58.0	13.5	14.5
Brennan	29.8	54.5	54.8	15.8	15.4
Kelby	33.4	54.2	58.5	13.6	14.9
Vida	35.5	53.2	57.1	14.6	15.0
Prosper	35.2	52.2	54.2	13.1	14.0
Howard	33.3	51.9	55.1	13.9	14.3
Elgin-ND	36.9	51.7	56.2	13.3	14.1
SY Soren	35.0	51.5	56.7	15.0	15.2
Mott	35.1	50.8	56.2	13.3	14.2
Velva	31.8	50.5	53.1	13.8	14.4
Duclair	32.0	49.2	55.5	13.7	14.6
Choteau	31.3	48.3	50.4	14.1	14.7
LCS Powerplay	44.7	--	56.9	14.3	--
Breaker	44.6	--	59.1	12.8	--
LCS Breakaway	41.7	--	59.1	13.3	--
Sabin	38.3	--	54.6	14.1	--
SY Rowyn	37.5	--	58.0	13.9	--
Forefront	37.0	--	57.5	14.0	--
Freyr	37.9	--	58.6	13.2	--
Advance	36.7	--	58.9	13.2	--
LSD 10%	6.60	--	2.7	0.90	--

Planted: May 23 **Harvested:** September 18

Previous Crop: Spring Wheat

^ Reported on a 13.5% moisture basis

* Reported on a 12% moisture basis

Dryland Notill Spring Wheat
Beach, ND

	Yield^		TW	Protein*	
	bu/a		lb/bu	%	
Cultivar	2014	2 yr	2014	2014	2 yr
Vida	57.2	62.1	58.7	12.5	12.0
Velva	49.8	59.5	58.5	13.0	12.7
Elgin-ND	55.1	59.3	58.5	13.6	12.9
Breaker	51.2	58.0	58.1	13.1	12.3
Howard	43.3	57.5	58.7	12.7	12.4
Prosper	47.6	57.5	58.5	12.5	11.9
Mott	51.2	56.5	58.2	13.2	12.6
Jenna	43.6	54.7	57.0	12.0	11.8
RB07	44.2	53.4	58.4	12.4	12.3
Advance	36.6	51.5	58.9	11.2	11.1
Choteau	42.8	51.3	57.1	12.9	12.6
SY Soren	41.2	51.2	59.0	13.1	12.7
Duclair	37.9	48.7	57.2	12.4	12.2
SY Rowyn	29.7	47.7	59.0	12.1	11.7
Barlow	30.0	47.2	58.1	13.9	13.3
Forefront	25.5	45.6	58.6	12.3	12.3
Brennan	31.6	45.3	57.9	13.5	13.2
Glenn	29.1	41.4	60.8	12.7	12.9
Kelby	26.4	41.4	58.0	14.4	14.1
LCS Powerplay	49.3	--	59.2	11.5	--
LCS Breakaway	44.6	--	60.0	12.4	--
Sabin	42.3	--	59.0	12.3	--
Freyr	39.0	--	58.8	12.2	--
LSD 10%	6.11	--	0.35	0.96	--

Planted: May 22 **Harvested:** October 9

Previous Crop: Green Peas

^ Reported on a 13.5% moisture basis

* Reported on a 12% moisture basis

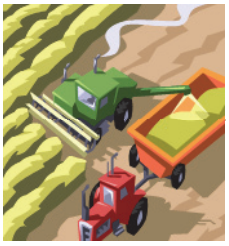
"Even if a farmer intends to loaf, he gets up in time to get an early start"

-Edgar Watson Howe

"The farmers are the founders of civilization."
-Daniel Webster

"A farm is a good thing, when it begins and ends with itself, and does not need a salary, or shop, to eke it out."

-Ralph Waldo Emerson



Wheat Variety Comparisons - - - Williston, ND

Column "$/A" was arrived at by calculating a gross per acre income for each variety using market price and protein premiums obtained on November 5, 2014. The base price for 14% protein wheat was $5.84, and for terminal durum was $10.00. Durum market price recently spiked due to 2014 disease issues. All spring wheat varieties are compared to Barlow and durum varieties to Ben on a plus or minus $/A basis.

	3 Year Avg. (2012-14)			
Cultivar	Yield bu/a	Protein %	Gross Ret $/a	$/A +or- Barlow
Hard Red Spring Wheat				
Velva	39.7	15.3	$265.59	$29.69
Vida	41.1	14.8	$264.68	$28.78
Jenna	38.9	15.4	$260.24	$24.34
RB07	38.1	15.2	$252.98	$17.08
Elgin-ND	37.6	15.8	$255.30	$19.40
Brennan	37.5	15.6	$252.75	$16.85
Kelby	36.4	15.8	$247.16	$11.26
Duclair	36.6	15	$243.02	$7.12
Breakaway	36.3	15.2	$241.03	$5.13
SY Tyra	36.2	15.1	$240.37	$4.47
SY Soren	35.6	15.5	$239.94	$4.04
Freyr	35.7	15.3	$238.83	$2.93
Glenn	35.3	15.6	$237.92	$2.02
Prosper	35.4	15.3	$236.83	$0.93
Barlow	35	15.6	$235.90	$0.00
Reeder	36.6	14.8	$235.70	($0.20)
Choteau	34.4	16.1	$235.30	($0.60)
Powerplay	40.1	14.2	$234.18	($1.72)
ND 901CL	33	16.9	$230.67	($5.23)
Faller	34.7	15.1	$230.41	($5.49)
Mott	33.4	16.2	$228.46	($7.44)
WB-Digger	36.4	14.5	$227.14	($8.76)
Steele-ND	33.9	15.4	$226.79	($9.11)
Forefront	40.2	13.9	$226.73	($9.17)
Breaker	35.7	14.4	$222.77	($13.13)
Howard	33.1	15.2	$219.78	($16.12)
Advance	33	14	$192.72	($43.18)

	3 Year Avg. (2012-14)			
Cultivar	Yield bu/a	Protein %	Gross Ret $/a	$/A +or- Ben
Durum				
Joppa	41.9	15.3	$419.00	$39.00
VT Peak	41.3	14.9	$413.00	$33.00
AC Commander	41.2	15.4	$412.00	$32.00
Tioga	40.7	15.8	$407.00	$27.00
Maier	40	15.8	$400.00	$20.00
Alkabo	39.1	15.7	$391.00	$11.00
Pierce	38.6	15.3	$386.00	$6.00
DG Max	38.5	15.5	$385.00	$5.00
Normanno	38.4	14.6	$384.00	$4.00
Mountrail	38.3	15.4	$383.00	$3.00
AC Navigator	38.2	14.7	$382.00	$2.00
Ben	38	14.7	$380.00	$0.00
Alzada	38	14.7	$380.00	$0.00
Grenora	37.6	15.5	$376.00	($4.00)
Divide	37.3	15.2	$373.00	($7.00)
Carpio	37.1	15.4	$371.00	($9.00)
Strongfield	36.9	15	$369.00	($11.00)
Rugby	36	15.4	$360.00	($20.00)
Lebsock	34.9	14.5	$349.00	($31.00)
CDC Verona	33.3	15.4	$330.00	($50.00)
Silver	30.8	15.1	$308.00	($72.00)

"The farmer is the only man in our economy who buys everything at retail, sells everything at wholesale, and pays the freight both ways."

-John F. Kennedy

Durum Variety Descriptions

Variety	Origin[1]	Height	Maturity	Resistance To[2]					Quality Factors			
				Lodging	Leaf Rust	Foliar Disease	Root Rot	Scab	Test Weight	Kernel Size[3]	Grain Protein	Overall Quality
AC Avonlea	Canada	medium	M early	MS	R	MS	S	VS	medium	large	M high	good
AC Commander	Canada	M short	late	M	R	MS	M	VS	medium	large	M high	good
AC Navigator	Canada	M short	M late	M	R	M	S	S	medium	V large	medium	good
Alkabo	NDSU	medium	medium	R	R	M	M	MS	high	large	M low	good
Alzada	WB	short	early	M	R	S	M	VS	medium	large	medium	excellent
Ben	NDSU	tall	medium	MR	R	MR	M	S*	V high	V large	M high	average
Carpio	NDSU	tall	M late	MS	R	M	NA	M	medium	large	M high	excellent
CDC Verona	Canada	M tall	M late	M	R	MR	NA	S	medium	large	M high	good
DG Max	DGP	M tall	medium	M	MR	MR	NA	MS	high	medium	M high	good
DG Star	DGP	M tall	M early	M	R	M	NA	NA	medium	M small	medium	good
Dilse	NDSU	M tall	late	M	R	M	M	MS	high	medium	high	excellent
Divide	NDSU	M tall	M late	M	R	M	M	MR	medium	medium	M high	excellent
Grande D'Oro	WB/DGP	M tall	medium	MR	R	M	MS	NA	high	M small	medium	average
Grenora	NDSU	medium	M early	M	R	M	MR	MS	medium	medium	medium	good
Joppa	NDSU	medium	medium	R	R	M	NA	M	medium	large	medium	good
Kyle	Canada	tall	medium	S	MR	M	S	NA	medium	M large	medium	good
Lebsock	NDSU	M tall	medium	R	R	M	MS	MS	high	large	medium	average
Maier	NDSU	M tall	M late	M	R	M	M	S*	high	medium	high	average
Monroe	NDSU	tall	early	M	R	M	S	VS	medium	large	M high	good
Mountrail	NDSU	M tall	M late	M	R	M	M	S*	medium	medium	medium	average
Pierce	NDSU	M tall	medium	M	R	MS	MR	S	V high	medium	medium	excellent
Rugby	NDSU	tall	M early	R	R	MR	M	S	medium	medium	medium	poor
Silver	MSU	short	early	R	NA	M	NA	S	M high	small	M high	good
Strongfield**	Canada	M tall	M late	M	R	MS	NA	S	medium	M large	V high	good
Tioga	NDSU	tall	M late	MR	R	M	NA	MS	M high	medium	M high	excellent
Westhope	WB	M tall	medium	M	R	M	NA	S	M high	M large	medium	good
VT Peak	Viterra	M tall	medium	MS	NA	NA	NA	NA	medium	M small	M high	good

[1] Refers to developer: DGP = Dakota Growers Pasta; MSU = Montana State University; NDSU = North Dakota State University.

[2] R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible; NA = data not available. All varieties are resistant to current stem rust races. Foliar Disease = reaction to tan spot and septoria leaf spot complex.

[3] Number seeds/lb: small = less than 11,000; medium = 11,000-12,000; large = more than 12,000.

* Indicates yield and/or quality have been higher than would be expected based on visual head blight symptoms alone.

** Indicates low cadmium variety.

David Schmidt

WREC Irrigation
Ag Technician

Nesson Valley Irrigation
Durum Seed Increase
Field

Sprinkler Irrigated Durum
Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	3 yr	2014	2014	3 yr
Mountrail	118	85.0	60.0	13.6	14.3
Grenora	112.2	81.0	58.8	12.7	13.8
Alkabo	112.6	80.2	59.7	12.5	13.8
Divide	114.8	77.4	60.8	14.0	14.6
Tioga	100.4	73.6	59.2	11.9	13.7
Strongfield	110.5	73.6	59.0	14.4	15.3
Silver	106.4	68.7	58.7	14.0	14.8
Alzada	91.8	60.5	57.7	13.9	15.0
Joppa	112.4	--	60.2	12.1	--
Carpio	103.7	--	60.5	12.6	--
LSD 5%	12.3		0.7	1.4	

Planted: May 8 **Harvested:** Aug 28
Previous Crop: Safflower

Dryland Recrop Durum
Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	3 yr	2014	2014	3 yr
Alkabo	35.8	27.5	60.5	10.9	13.2
Divide	34.3	26.0	60.0	10.7	13.1
Mountrail	29.6	24.4	59.5	10.9	13.9
Grenora	32.0	24.4	59.5	11.0	13.5
Tioga	32.7	24.1	59.5	12.3	14.2
Strongfield	30.1	24.0	60.0	11.6	14.7
Alzada	31.5	23.3	60.5	12.0	13.7
Silver	21.3	21.4	59.0	12.9	15.0
Joppa	31.6	--	60.5	11.5	--
Carpio	30.4	--	60.0	11.9	--
LSD 5%	5.8				

Planted: Apr 23 **Harvested:** Aug 14
Previous Crop: Peas

Dryland Fallow Statewide Durum
Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	3 yr	2014	2014	3 yr
Alkabo	39.5	38.3	61.8	10.4	13.7
Tioga	36.5	37.9	61.3	10.4	13.4
Alzada	35.4	37.3	61.5	10.0	12.8
Mountrail	33.2	36.2	61.2	10.8	13.8
Divide	36.9	36.2	61.3	10.2	13.5
Strongfield	34.3	34.6	61.5	10.7	13.6
Grenora	33.1	34.6	61.2	11.0	13.7
Silver	32.2	33.2	60.8	11.1	13.8
Joppa	36.0	--	61.2	10.8	--
Carpio	30.7	--	60.8	10.4	--
LSD 5%	3.9		1.1	1.2	

Planted: Apr 25 **Harvested:** Aug 13

Dryland Fallow Regional Durum
Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	3 yr	2014	2014	3 yr
Tioga	44.5	38.2	62.0	10.2	12.2
Divide	43.0	35.7	60.5	9.0	11.8
Joppa	41.2	35.7	61.0	9.0	11.1
Mountrail	44.7	34.7	59.5	11.6	13.1
Alkabo	43.7	33.9	61.0	10.6	12.4
Carpio	39.7	33.7	61.0	9.5	12.5
Strongfield	38.3	--	61.5	10.3	--
LSD 5%	4.1				

Planted: Apr 25 **Harvested:** Aug 14

Dryland Fallow Durum
Poplar, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	3 yr	2014	2014	3 yr
Alkabo	45.8	51.5	59.5	14.5	14.8
Tioga	43.5	51.3	56.5	15.8	15.9
Grenora	40.8	51.0	56.5	14.8	15.0
Mountrail	41.1	48.9	57.5	15.6	15.5
Divide	41.8	47.1	58.5	15.4	15.7
Strongfield	41.5	47.0	56.5	15.4	16.2
Silver	38.6	45.4	56.0	15.3	15.4
Alzada	39.7	45.0	56.5	15.0	15.0
Joppa	41.6	--	58.0	15.6	--
Carpio	41.3	--	57.5	15.7	--
LSD 5%	4.9				

Planted: May 21 **Harvested:** Sep 12

Dryland Fallow Durum
Nashua, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2014	3 yr	2014	2014	3 yr
Silver	37.5	38.3	52.5	17.3	15.2
Grenora	45.2	37.0	55.5	13.7	13.3
Alzada	36.6	35.8	54.5	16.3	14.3
Strongfield	40.5	34.8	55.0	17.0	15.6
Mountrail	36.4	34.6	53.5	14.8	14.3
Alkabo	28.8	32.8	54.5	15.6	14.6
Tioga	27.0	31.4	55.0	14.3	13.8
Divide	20.6	28.5	55.0	17.5	15.0
Joppa	34.8	--	55.5	16.6	--
Carpio	26.1	--	55.5	14.2	--
LSD 5%	8.4				

Planted: May 23 **Harvested:** Sep 15

Dryland Recrop Durum
Wibaux, MT

Cultivar	Yield bu/a 2014	TW lb/bu 2014	Protein % 2014
Mountrail	59.2	58.5	12.7
Carpio	58.4	58.5	12.3
Grenora	58.4	57.0	12.8
Joppa	57.0	58.5	12.6
Strongfield	55.0	58.5	14.5
Alkabo	49.4	58.5	12.7
Alzada	49.2	58.5	13.5
Silver	46.9	58.0	12.6
Tioga	45.4	58.5	12.4
Divide	45.1	59.0	12.5
LSD 5%	8.6		

Planted: May 22 **Harvested:** Sep 16
Previous Crop: Lentils

Dryland Fallow Durum
Flaxville, MT

Cultivar	Yield bu/a 2014	Yield bu/a 2 yr	TW lb/bu 2014	Protein % 2014	Protein % 2 yr
Mountrail	58.6	41.3	60.5	13.2	11.6
Carpio	49.1	37.4	61.0	12.2	11.2
Grenora	47.7	35.3	59.5	13.2	11.8
Alkabo	46.0	35.0	60.5	12.1	11.0
Strongfield	43.9	34.5	59.5	14.1	12.8
Alzada	44.4	33.6	59.0	13.9	12.0
Tioga	38.3	32.2	59.0	11.5	10.7
Divide	36.0	30.2	60.0	13.1	11.8
Silver	36.2	29.0	57.0	14.1	13.2
Joppa	53.4	--	60.5	13.1	--
LSD 5%	12.5				

Planted: May 21 **Harvested:** Sep 12

Agriculture And The Environment

- *Careful stewardship by farmers has spurred a nearly 50 percent decline in erosion of cropland by wind and water since 1982.*
- *Conservation tillage, a way of farming that reduces erosion (soil loss) on cropland while using less energy, has grown from 17% of acreage in 1982 to 63% today. At the same time, total land used for crops declined by 15% (70 million acres).*
- *Farmers have enrolled a total of 31 million acres in the Conservation Reserve Program to protect the environment and provide habitat for wildlife. Since its inception in 1985, the program has helped reduce soil erosion by 622 million tons and restored more than 2 million acres of wetlands.*
- *Each year, hundreds of thousands of trees are planted on farmland.*
- *Crop rotation, the practice of growing different crops in succession on the same land, is another way farmers take care of the land.*

Dryland Notill Durum
Williston, ND

Cultivar	Yield^ bu/a 2014	Yield^ bu/a 3 yr	TW lb/bu 2014	Protein* % 2014	Protein* % 3 yr
Joppa	37.3	41.8	61.7	13.6	14.9
VT Peak	33.8	41.3	62.3	14.9	15.0
AC Commander	37.3	41.2	61.5	14.3	15.3
Tioga	41.1	40.6	62.1	14.6	15.6
Maier	33.7	40.0	61.2	14.9	15.5
Alkabo	35.4	39.1	61.5	14.4	14.9
Pierce	31.9	38.6	61.6	15.0	15.3
DG Max	34.6	38.4	61.4	15.2	15.3
Normanno	32.7	38.4	58.9	14.6	14.8
Mountrail	34.5	38.3	60.5	14.9	15.8
AC Navigator	37.3	38.1	61.9	15.3	15.5
Ben	34.9	38.1	61.6	15.5	15.9
Alzada	36.1	38.0	60.8	15.5	15.1
Grenora	31.0	37.6	60.7	14.2	15.0
Divide	34.8	37.3	61.7	14.8	15.3
Carpio	35.5	37.1	61.1	14.0	15.2
Strongfield	31.1	36.9	61.0	14.8	15.3
Rugby	33.0	36.0	61.6	15.0	15.9
Lebsock	31.0	34.9	62.0	14.4	15.4
CDC Verona	27.7	33.3	61.3	14.7	16.0
Silver	30.7	--	60.5	15.4	--
LSD 10%	3.72	--	0.50	0.92	--

Planted: May 10 **Harvested:** August 19
Previous Crop: Green Peas
^ Reported on a 13.5% moisture basis
* Reported on a 12% moisture basis

Dryland Notill Durum Montana State Trial
Williston, ND

Cultivar	Yield^ bu/a 2014	Yield^ bu/a 3 yr	TW lb/bu 2014	Protein* % 2014	Protein* % 3 yr
Alkabo	45.2	42.5	61.1	15.8	15.6
Mountrail	42.2	42.2	59.5	16.4	15.8
Divide	42.6	41.4	60.2	16.7	15.8
Tioga	44.6	40.8	60.9	16.3	16.1
Alzada	39.2	40.5	59.8	16.4	15.4
Grenora	42.4	40.1	60.0	16.1	15.4
Silver	36.4	38.8	59.7	17.0	16.2
Joppa	43.3	--	60.6	16.2	--
Strongfield	41.1	--	59.6	17.0	--
Carpio	37.8	--	59.7	16.0	--
LSD 10%	3.79	--	0.40	0.59	--

Planted: May 10 **Harvested:** August 13
Previous Crop: Green Peas
^ Reported on a 13.5% moisture basis
* Reported on a 12% moisture basis

"We lose ourselves in the things we love.
We find ourselves there, too."

-Kristin Martz

Sprinkler Irrigated Durum Wheat
Nesson Valley, ND

Cultivar	Yield --- bu/a --- 2014	Yield --- bu/a --- 3 yr	TW lb/bu 2014	Protein* --- % --- 2014	Protein* --- % --- 3 yr
Joppa	89.0	88.7	62.1	14.3	14.3
Carpio	90.2	85.1	62.0	14.9	15.0
Mountrail	92.2	84.9	62.0	14.4	15.1
Grenora	94.8	82.6	61.9	14.1	14.5
Tioga	92.8	81.7	61.3	13.7	14.2
Pierce	96.0	79.3	62.6	14.6	14.6
Alkabo	90.1	78.4	62.1	14.7	14.7
Ben	87.8	77.9	62.1	14.7	15.1
CDC Verona	90.5	76.9	60.5	15.5	16.4
DG Max	90.4	76.4	62.2	15.3	15.1
Commander	85.8	75.3	60.4	14.7	15.0
Rugby	79.7	75.1	61.6	15.6	15.6
Maier	78.9	74.9	61.5	15.6	15.4
Lebsock	85.0	74.6	62.3	14.8	14.7
AC Navigator	79.5	73.2	60.6	14.6	15.0
DG Star	85.2	73.0	60.9	15.3	15.2
Divide	80.2	72.7	61.3	14.9	15.0
Strongfield	91.5	71.1	61.1	15.5	16.2
Silver	80.0	69.4	59.3	14.8	15.0
Alzada	76.5	67.9	59.8	15.3	15.0
VT Peak	84.1	--	62.9	14.7	--
Normanno	74.0	--	57.5	15.6	--
LSD 10%	8.2	--	0.6	0.7	--

Planted: May 13 **Harvested:** August 28
Previous Crop: Soybean
^ Reported on a 13.5% moisture basis
* Reported on a 12% moisture basis

Dryland Notill Durum
Crosby, ND

Cultivar	Yield^ bu/a 2014	Yield^ bu/a 3 yr	TW lb/bu 2014	Protein* % 2014	Protein* % 3 yr
Grenora	32.5	48.0	53.9	14.5	14.4
Pierce	30.5	47.6	56.0	14.5	14.6
Maier	25.3	47.1	53.5	15.5	15.0
Lebsock	30.7	45.4	55.3	15.1	14.7
Mountrail	33.6	44.8	53.6	15.0	15.1
Tioga	29.6	44.5	53.3	14.1	14.3
Divide	29.3	42.3	54.7	16.0	15.6
Alkabo	31.7	43.4	55.0	15.1	14.9
Strongfield	30.9	42.3	53.6	16.1	16.3
Ben	31.5	40.5	53.9	15.4	15.4
AC Commander	26.7	41.2	50.8	15.7	14.9
DG Max	23.5	36.5	53.8	15.8	15.6
Silver	23.7	35.7	50.9	16.5	15.5
Alzada	14.4	30.0	48.2	17.1	15.6
Joppa	35.0	--	56.0	14.2	--
Carpio	32.6	--	55.4	14.6	--
VT Peak	31.0	--	57.3	14.2	--
Normanno	17.9	--	46.9	15.6	--
LSD 10%	4.10	--	1.20	1.20	--

Planted: May 23 **Harvested:** September 18
Previous Crop: Spring Wheat
^ Reported on a 13.5% moisture basis
* Reported on a 12% moisture basis

Diana Amiot,
WREC
Research Specialist-Crop Production

Ghazal Ebadzad
EARC
Plant Pathology

Dryland Notill Durum
Beach, ND

Cultivar	Yield^ bu/a 2014	Yield^ bu/a 2 yr	TW lb/bu 2014	Protein* % 2014	Protein* % 2 yr
Grenora	59.2	70.0	57.3	14.2	12.8
Mountrail	62.4	67.2	58.4	12.9	12.0
Joppa	55.6	65.7	58.5	13.6	12.2
VT Peak	57.8	64.4	59.2	14.6	12.9
Maier	41.9	62.6	58.1	13.9	12.8
Strongfield	57.4	62.3	57.5	15.1	13.4
AC Commander	54.7	60.8	57.3	13.7	12.5
Tioga	43.7	60.7	56.6	12.9	11.7
Pierce	51.0	60.2	59.0	13.1	12.1
Alkabo	48.9	60.2	57.7	13.0	12.1
Lebsock	42.1	59.9	58.9	12.4	11.7
Divide	52.3	59.3	57.5	12.7	11.9
DG Max	41.3	58.5	57.7	14.8	12.8
Carpio	55.4	58.3	58.0	13.5	12.2
Ben	49.6	57.7	58.6	13.6	12.5
Normanno	50.3	51.4	56.3	15.2	13.3
Silver	47.0	46.9	56.6	14.3	13.5
Alzada	42.5	45.2	57.1	13.7	13.0
LSD 10%	7.96	--	0.50	1.07	--

Planted: May 22 **Harvested:** October 9
Previous Crop: Field Peas
^ Reported on a 13.5% moisture basis
* Reported on a 12% moisture basis

Hard Red Winter Wheat Variety Descriptions

Variety	Origin[1]	Height	Maturity	Winter Hardiness[3]	Resistance To[2]				Quality Factors	
					Lodging	Stem Rust	Leaf Rust	Foliar Disease	Test Weight	Grain Protein
AC Broadview	Canada	MEDIUM	MEDIUM	GOOD	R	R	R	NA	MEDIUM	MEDIUM
Art	AgriPro	M SHORT	M EARLY	FAIR	R	R	R	MS	HIGH	M HIGH
Boomer	WB	MEDIUM	MEDIUM	GOOD	R	R	MR	S	HIGH	MEDIUM
CDC Accipiter	Canada	SHORT	MEDIUM	GOOD	R	R	MS	S	MEDIUM	MEDIUM
CDC Falcon	Canada	M SHORT	MEDIUM	GOOD	M	R	MS	MS	MEDIUM	M LOW
Colter	MSU	MEDIUM	MEDIUM	GOOD	MR	R	S	NA	MEDIUM	MEDIUM
Darrell	SDSU	MEDIUM	MEDIUM	GOOD	R	R	S	MR	M HIGH	MEDIUM
Decade	MSU/NDSU	MEDIUM	M EARLY	GOOD	R	R	S	M	MEDIUM	MEDIUM
Expedition	SDSU	MEDIUM	MEDIUM	FAIR	R	R	MS	MS	LOW	MEDIUM
Flourish	Canada	SHORT	EARLY	GOOD	R	MR	R	NA	MEDIUM	M LOW
Genou*	MSU	MEDIUM	MEDIUM	POOR	MS	MS	S	NA	M LOW	MEDIUM
Ideal	SDSU	SHORT	MEDIUM	GOOD	R	MR	MR	MS	MEDIUM	MEDIUM
Jerry	NDSU	MEDIUM	MEDIUM	GOOD	MR	R	MR	M	MEDIUM	M HIGH
Judy*	MSU	MEDIUM	MEDIUM	FAIR	R	S	S	NA	MEDIUM	M HIGH
Lyman	SDSU	MEDIUM	MEDIUM	FAIR	M	R	R	MR	M HIGH	M HIGH
McGill	NE	M TALL	M EARLY	V GOOD	MS	NA	MR	NA	MEDIUM	M LOW
Moats	Canada	MEDIUM	MEDIUM	GOOD	MS	R	MR	NA	M HIGH	MEDIUM
Overland	NE	M TALL	MEDIUM	FAIR	MS	MS	MR	NA	M HIGH	MEDIUM
Peregrine	Canada	MEDIUM	M LATE	V GOOD	MR	R	MR	NA	M HIGH	M LOW
Radiant	Canada	TALL	LATE	GOOD	R	S	S	NA	MEDIUM	M LOW
Rampart*	MSU	MEDIUM	M LATE	FAIR	R	R	S	MR	MEDIUM	HIGH
Robidoux	NE	M SHORT	M EARLY	POOR	MR	NA	MS	NA	MEDIUM	M LOW
Sunrise	Canada	MEDIUM	MEDIUM	GOOD	MS	MR	MS	R	MEDIUM	LOW
SY Wolf	AgriPro	M SHORT	MEDIUM	POOR	R	R	MR	MR	HIGH	M LOW
Warhorse	MSU	SHORT	M LATE	FAIR	MR	R	S	NA	MEDIUM	MEDIUM
WB-Grainfield	WB	SHORT	M LATE	GOOD	MR	NA	MR	MS	M LOW	MEDIUM
WB-Matlock	WB	MEDIUM	MEDIUM	GOOD	MR	R	MS	MS	MEDIUM	MEDIUM
WB-Quake*	WB	MEDIUM	LATE	FAIR	MR	NA	MR	NA	M LOW	M LOW
Wesley	NE	SHORT	EARLY	V GOOD	R	R	MR	MR	HIGH	MEDIUM
Yellowstone	MSU	MEDIUM	MEDIUM	GOOD	M	S	MS	M	LOW	M HIGH

[1] Refers to developer: MSU = Montana State University; NDSU = North Dakota State University; NE = University of Nebraska; SDSU = South Dakota State University; WB = WestBred.

[2] R = resistant, MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; NA = data not available.

[3] Varieties with fair to poor winter hardiness should not be seeded on bare soil.

* Sawfly resistant.

Hard White Winter Wheat Variety Descriptions

Variety	Origin[1]	Height	Maturity	Winter Hardiness[3]	Resistance To[2]				Quality Factors	
					Lodging	Stem Rust	Leaf Rust	Foliar Disease	Test Weight	Grain Protein
Alice	SDSU	SHORT	EARLY	FAIR	MR	MR	S	NA	M HIGH	M LOW
Gary	ID	MED	M LATE	FAIR	MR	NA	NA	NA	MED	LOW
Hyalite*	MSU/WB	M SHORT	M EARLY	FAIR	MR	R	S	NA	MED	MED
NuDakota	AgriPro	SHORT	M	POOR	R	MR	MR	NA	MED	MED
NuFrontier	GM/AgriPro	M SHORT	EARLY	FAIR	R	NA	NA	NA	M HIGH	LOW
NuHorizon	GM/AgriPro	SHORT	EARLY	POOR	R	NA	NA	NA	HIGH	M LOW
NuSky	MSU	MED	M LATE	GOOD	R	MR	S	MR	MED	MED
NuWest	MSU/GM	MED	M	GOOD	R	MR	S	MR	M LOW	MED
Wendy	SDSU	SHORT	EARLY	GOOD	NA	NA	NA	NA	MED	MED

[1] Refers to developer: GM = General Mills; ID = University of Idaho; MSU = Montana State University; SDSU = South Dakota State University; WB = WestBred.

[2] R = resistant, MR = moderately resistant; S = susceptible; NA = data not available.

[3] Varieties with fair to poor winter hardiness should not be seeded on bare soil.

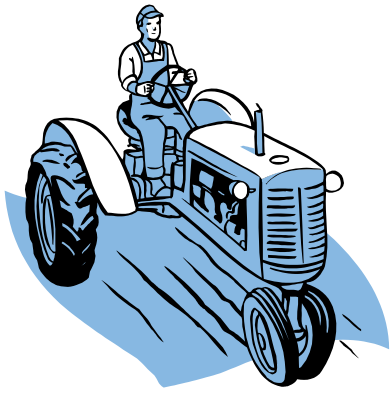
* Clearfield wheat with imidazolinone tolerance.

EARC does not have any data to report for Hard Winter Wheat for 2013 due to hail damage, and EARC and WREC do not have data to report in 2014 due to severe winterkill.

Dryland Fallow Winter Wheat
Williston, ND

Cultivar	Winter Survival % 2013	Yield^ bu/a 2013	Yield^ bu/a 3 yr	TW lb/bu 2013	Protein* % 2013	Protein* % 3 yr
Boomer	70.0	51.9	56.3	58.0	10.9	11.3
Jerry	76.7	52.6	56.1	59.1	11.9	12.4
CDC Accipiter	80.0	52.7	55.8	60.4	10.9	10.9
WB-Matlock	45.0	51.7	54.2	59.9	12.2	12.3
CDC Falcon	41.7	44.7	52.9	59.2	11.1	11.1
Peregrine	76.7	49.7	51.6	60.3	9.7	10.9
Ideal	60.0	46.1	51.3	59.9	11.1	11.5
Overland	38.3	37.7	50.8	59.4	12.1	12.5
Decade	26.7	32.9	49.5	60.2	12.1	12.6
Expedition	51.7	44.7	45.1	58.9	11.5	12.0
Lyman	31.7	29.9	44.2	59.5	12.9	12.6
SY Wolf	43.3	37.9	43.5	59.7	11.1	11.8
Wesley	23.7	33.9	43.1	59.3	12.3	12.8
Art	10.3	28.1	39.4	60.4	12.8	13.0
Sunrise	58.3	59.8	--	58.4	10.0	--
Moats	63.3	56.1	--	60.1	11.6	--
McGill	83.3	52.9	--	59.6	12.1	--
AC Broadview	70.0	48.0	--	59.0	10.7	--
WB-Grainfield	50.0	46.6	--	58.6	11.1	--
Flourish	40.0	46.1	--	58.4	11.0	--
Freeman	20.3	40.9	--	58.1	11.0	--
NI08708	30.0	38.1	--	58.0	11.5	--
Robidoux	25.0	35.7	--	59.7	11.2	--
LSD 10%	30	10.9	--	0.6	0.7	--

Planted: Sept 21, 2012 **Harvested:** August 13, 2013
Previous Crop: Soybean
^ Reported on a 13.5% moisture basis
* Reported on a 12% moisture basis



Dryland Notill Winter Wheat
Williston, ND

Cultivar	Winter Survival % 2013	Yield^ bu/a 2013	Yield^ bu/a 3 yr	TW lb/bu 2013	Protein* % 2013	Protein* % 3 yr
Jerry	57.5	48.7	58.1	56.5	11.6	12.5
Overland	50.0	29.5	57.2	58.1	11.8	12.4
Radiant	57.5	48.3	56.2	58.7	10.8	11.4
Boomer	42.5	39.8	55.1	56.8	11.0	12.3
CDC Accipiter	37.5	39.5	54.9	58.9	10.1	11.2
Peregrine	77.5	37.7	54.6	58.3	9.8	11.0
CDC Falcon	27.5	28.1	54.0	58.0	9.9	11.2
Decade	22.5	29.3	53.2	58.8	12.6	12.7
Darrell	30.0	35.5	52.4	58.4	11.8	12.5
WB-Matlock	35.0	34.2	51.9	57.9	12.2	12.7
SY Wolf	40.0	25.0	51.2	57.9	11.5	11.6
Lyman	47.5	30.7	48.0	58.0	12.5	13.3
Wesley	20.0	24.1	47.7	58.2	11.9	12.3
Art	12.5	14.2	44.2	58.8	13.0	13.0
Moats	80.0	55.5	--	58.2	10.6	--
Sunrise	82.5	52.2	--	56.4	9.0	--
AC Broadview	52.5	48.3	--	57.0	9.8	--
Ideal	52.5	33.9	--	58.0	11.0	--
Freeman	55.0	33.8	--	55.4	11.1	--
Expedition	40.0	32.3	--	58.6	12.2	--
Alice	47.5	29.5	--	57.5	11.0	--
Flourish	27.5	28.9	--	56.8	10.5	--
NI08708	37.5	26.6	--	55.8	10.9	--
WB-Grainfield	60.0	25.6	--	57.9	11.5	--
McGill	25.0	21.3	--	57.6	10.2	--
Robidoux	10.0	20.7	--	58.6	11.5	--
Yellowstone	20.0	20.5	--	58.2	11.2	--
LSD 10%	37.8	12.7	--	1.2	1.4	--

Planted: Sept 26, 2012 **Harvested:** August 15, 2013
Previous Crop: Spring Wheat
^ Reported on a 13.5% moisture basis
* Reported on a 12% moisture basis

"I know of no pursuit in which more real and important services can be rendered to any country than by improving its agriculture, its breed of useful animals, and other branches of a husbandman's cares."

-George Washington

Barley Variety Descriptions

Variety	Origin[1]	Use[2]	Height	Maturity	Resistance To[3]					Quality Factors	
					Lodging	Stem Rust	Loose Smut	Net Blotch	Spot Blotch	Test Weight	Grain Protein
Two-Row											
AC Metcalfe*	Canada	M	medium	late	M	S	MR	MS	MS	medium	medium
CDC Copeland*	Canada	M	tall	M late	MS	MR	S	MS	VS	low	medium
Champion	WB	F	medium	medium	MR	R	S	MR	NA	M low	medium
Conlon*	NDSU	F/M	M short	early	MS	S	S	MR	MS	M high	M low
Conrad*	BARI	M	M tall	M late	MR	NA	S	NA	NA	M high	M low
Craft*	MSU	F/M	tall	medium	MR	NA	S	S	NA	M high	M high
Eslick	MSU	F	medium	M late	MS	S	NA	NA	MS	medium	M low
Geraldine	MSU	F/M	M short	M late	MR	NA	S	NA	NA	M high	M high
Harrington*	Canada	F/M	M short	late	S	S	S	MS	S	medium	M low
Haxby	MSU	F	medium	medium	MS	S	S	S	MS	V high	medium
Hockett*	MSU	F/M	medium	medium	MS	S	S	NA	NA	medium	M high
Lilly	Germany	F	short	medium	MR	S	NA	S	MR	medium	medium
Merit	BARI	F/M	M tall	late	MS	MS	S	MS	S	low	medium
Pinnacle*	NDSU	F/M	medium	M late	MR	S	S	MS	MR	high	low
Rawson	NDSU	F	medium	medium	MR	S	S	MR	MR	high	M low
Six-Row											
Celebration*	BARI	F/M	M short	medium	R	S	S	MS/S	MR/R	medium	medium
Innovation	BARI	M	M short	medium	MR	S	S	MS/S	MR/R	medium	medium
Lacey *	MN	F/M	M short	medium	MR	S	S	MS/S	MR/R	medium	medium
Legacy*	BARI	F/M	medium	M late	MR	S	S	MS/S	MR/R	medium	medium
Quest*	MN	M	M short	medium	MS	S	S	MR	MR/R	M low	medium
Robust*	MN	F/M	tall	medium	MS	S	S	MS/S	MR/R	medium	M high
Stellar-ND*	NDSU	F/M	M short	medium	R	S	S	MS/S	MR/R	medium	M low
Tradition*	BARI	F/M	M short	medium	R	S	S	MS/S	MR/R	medium	M low
Specialty											
CDC Cowboy	Canada	H	V tall	medium	S	MR	S	M	M	medium	M high
Haybet	MSU	H	tall	medium	S	NA	S	NA	NA	low	medium
Hays	MSU	H	M tall	medium	MS	NA	NA	NA	NA	low	medium

[1] Refers to developer: BARI = Busch Ag Resources; Inc.; MN = University of Minnesota; MSU = Montana State University; NDSU = North Dakota State University; WB = WestBred.
[2] F = feed; M = malt.
[3] R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible. NA = data not available.
* Recommended as malting in Western U.S.

Dryland Fallow Barley
Sidney, MT

Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Plump % 2014	Protein % 2014	Protein % 3 yr
Champion	91.7	64.6	48.5	87	10.2	12.1
Craft	86.9	57.4	50.0	98	10.5	12.2
Eslick	83.4	55.3	49.0	91	9.1	12.2
Hockett	82.3	54.0	50.0	98	11.3	11.8
Conrad	76.5	53.5	47.5	95	11.0	13.8
Haxby	76.5	53.2	50.0	92	10.5	12.0
Tradition	77.8	51.6	47.5	85	11.6	12.6
Harrington	75.7	49.1	47.0	95	10.8	12.5
Pinnacle	79.6	47.7	49.0	99	9.8	11.5
Metcalfe	75.3	47.5	48.5	89	11.3	12.4
Hays*	78.9	--	47.0	87	10.9	--
LSD 5%	12.8					

Planted: Apr 24 **Harvested:** Aug 11
*forage barley

Dryland Recrop Barley
Sidney, MT

Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Protein % 2014	Protein % 3 yr
Conrad	42.8	31.4	48.5	12.2	12.4
Haxby	32.4	31.4	52.0	10.6	11.0
Harrington	44.5	31.2	47.5	12.4	11.2
Hockett	42.1	30.8	50.0	11.2	11.3
Tradition	44.5	29.9	48.5	12.6	10.8
Gallatin	36.0	29.7	49.5	12.4	11.2
Metcalfe	36.8	29.6	49.5	12.5	12.2
Geraldine	35.1	27.0	49.5	12.1	11.8
Champion	47.9	--	49.5	11.5	--
Eslick	35.1	--	47.5	11.6	--
Cowboy	31.6	--	50.5	12.6	--
Craft	22.5	--	49.5	12.4	--
LSD 5%	6.1				

Planted: Apr 23 **Harvested:** Aug 14
Previous Crop: Peas

Sprinkler Irrigated Barley
Sidney, MT

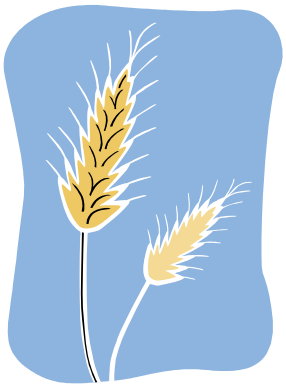
Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Plump % 2014	Protein % 2014	Protein % 3 yr
Champion	163.0	100.5	51.0	97	12.1	12.5
Eslick	152.7	94.6	49.5	94	11.9	13.6
Haxby	152.7	89.9	52.5	98	12.0	13.5
Craft	163.1	89.8	51.5	96	12.7	13.8
Pinnacle	152.9	85.9	49.5	98	10.5	12.0
Conrad	144.7	82.6	50.0	98	12.8	14.2
Tradition	134.5	80.8	49.5	98	12.4	13.1
Hockett	132.0	80.1	50.5	93	12.8	12.9
Metcalfe	150.0	79.4	50.5	97	12.1	14.0
Harrington	130.3	77.2	47.5	91	12.2	13.9
Hays	125.4	71.0	49.5	90	12.6	14.6
LSD 5%	22.7					

Planted: May 5 **Harvested:** Aug 19
Previous Crop: Safflower

Flood Irrigated Malt Barley
Sidney, MT

Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Plump % 2014	Protein % 2014	Protein % 3 yr
Lacey	116.4	86.4	51.0	93	12.7	13.2
Rawson	116.4	86.4	49.0	99	11.2	11.7
Stout	129.8	85.3	49.5	98	10.6	11.3
Innovation	111.5	85.3	51.0	99	11.8	11.9
Tradition	119.7	85.1	49.5	98	11.2	12.9
CDC Copeland	137.0	84.5	51.0	98	10.5	12.9
Quest	118.1	82.4	50.0	95	12.2	12.8
Celebration	111.0	79.7	49.0	93	12.2	12.8
Conlon	112.0	78.2	51.5	99	11.5	11.8
Stellar-ND	107.8	78.1	49.0	95	11.8	11.8
Robust	98.9	76.8	50.5	93	13.3	13.2
Pinnacle	117.3	76.0	51.0	99	10.5	11.4
AC Metcalfe	113.5	73.8	52.0	97	11.5	13.7
Conrad	112.3	73.3	52.0	99	11.3	13.7
Hockett	126.4	--	52.5	98	10.6	--
CDC Meredith	114.9	--	50.0	98	10.0	--
LSD 5%	17.1					

Planted: May 2 **Harvested:** Aug 11
Previous Crop: Sugarbeet



Sprinkler Irrigated Malt Barley
Sidney, MT

Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Plump % 2014	Protein % 2014	Protein % 3 yr
Lacey	155.1	106.3	50.5	98	12.0	12.9
Innovation	142.1	104.3	48.5	99	13.1	13.4
Stout	157.4	102.2	48.0	99	12.3	13.1
Tradition	152.1	101.0	49.0	98	12.2	13.3
Rawson	122.0	97.6	49.0	98	12.9	13.0
Stellar-ND	155.3	96.7	48.5	99	12.7	13.2
Robust	135.6	94.4	50.5	98	12.6	13.7
Conlon	140.4	92.7	51.0	98	12.5	13.2
Celebration	142.1	92.5	49.5	98	13.8	14.6
Conrad	137.8	92.0	50.5	97	12.2	13.7
Quest	127.8	91.6	49.0	96	12.7	13.6
CDC Copeland	143.1	89.3	49.0	98	11.2	13.3
Pinnacle	129.3	86.8	50.5	99	10.5	11.5
AC Metcalfe	138.4	83.9	49.5	98	11.9	13.2
CDC Meredith	133.0	--	47.5	95	12.2	--
Hockett	114.8	--	50.5	92	12.8	--
LSD 5%	15.7					

Planted: May 5 **Harvested:** Aug 19
Previous Crop: Safflower

Dryland Notill Barley
Williston, ND

Cultivar	Yield^ bu/a 2014	Yield^ bu/a 3 yr	TW lb/bu 2014	Plump % 2014	Protein* % 2014	Protein* % 3 yr
TWO ROW						
Rawson	75.2	74.1	49.4	96.8	14.6	13.9
Hockett	70.6	72.2	48.9	72.3	14.6	14.4
Pinnacle	71.1	71.7	48.2	87.4	14.4	13.9
Conlon	78.5	69.9	51.5	91.6	15.2	14.8
Conrad	59.4	65.6	48.0	79.1	15.8	15.6
AC Metcalfe	59.9	64.6	46.9	59.8	16.4	16.0
CDC	57.9	62.9	45.6	53.9	15.1	14.9
SIX ROW						
Tradition	77.5	70.6	48.9	65.5	15.4	14.8
Celebration	77.7	69.8	49.1	70.0	15.7	16.3
Innovation	64.5	68.7	46.6	65.6	14.4	15.0
Lacey	70.8	66.0	49.9	73.5	15.3	15.5
Stellar-ND	60.1	65.4	45.9	57.6	14.9	14.7
Robust	65.3	65.2	48.8	66.7	15.9	15.4
Quest	74.4	63.3	48.9	69.1	15.8	15.6
LSD 10%	6.94	--	0.99	7.34	0.69	--

Planted: May 10 **Harvested:** August 19
Previous Crop: Green Peas
^ Reported on a 13.5% moisture basis
* Reported on a 0% moisture basis

Sprinkler Irrigated Barley
Nesson Valley, ND

Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Plump % 2014	Protein* % 2014	Protein* % 3 yr
TWO ROW						
Conrad	120.9	90.4	52.8	95.9	13.5	13.5
Pinnacle	124.1	89.4	52.7	97.4	11.0	11.3
Lilly	133.3	87.6	53.3	92.3	12.0	12.4
AC	112.7	86.2	53.2	95.8	13.7	13.6
Conlon	114.7	85.9	53.0	97.9	13.0	13.3
Hockett	123.6	--	54.1	96.2	12.5	--
Rawson	108.3	--	51.9	97.4	12.5	--
SIX ROW						
Quest	132.6	94.8	51.9	91.3	12.4	13.0
Innovation	131.3	94.8	50.7	95.8	12.0	13.0
Lacey	131.5	93.6	52.7	95.4	12.6	13.4
Tradition	135.9	92.7	52.8	96.8	12.6	13.1
Celebration	131.0	92.3	52.1	94.9	13.1	13.6
Stellar-ND	129.5	87.3	51.2	96.2	12.5	13.1
LSD 10%	3.5	--	0.6	0.5	0.6	--

Planted: May 13 **Harvested:** August 15
Previous Crop: Soybean
* Reported on a 0% moisture basis

Dryland Notill Barley
Crosby, ND

Cultivar	Yield^ bu/a 2014	Yield^ bu/a 3 yr	TW lb/bu 2014	Plump % 2014	Protein* % 2014	Protein* % 3 yr
TWO ROW						
Pinnacle	104.0	98.5	49.7	93.3	11.3	11.5
AC Metcalfe	94.6	91.8	49.9	91.2	12.9	13.6
Rawson	77.6	91.2	47.7	95.0	12.8	12.8
Conrad	91.0	88.9	49.2	95.2	12.0	13.6
Conlon	83.5	76.7	50.0	96.8	13.0	13.7
Hockett	110.6	--	51.5	94.6	11.8	--
SIX ROW						
Stellar-ND	100.4	99.3	47.6	94.8	12.9	13.5
Lacey	100.8	94.7	48.0	95.2	12.3	14.4
Celebration	101.5	93.9	48.5	94.2	12.4	13.6
Tradition	96.3	88.1	48.6	95.3	12.3	13.5
Innovation	93.0	87.8	47.3	95.4	12.1	13.5
LSD 10%	9.3	--	0.9	3.0	1.3	--

Planted: May 23 **Harvested:** August 28
Previous Crop: Spring Wheat
^ Reported on a 13.5% moisture basis
* Reported on a 0% moisture basis

Dryland Notill Barley
Beach, ND

Cultivar	Yield^ bu/a 2014	Yield^ bu/a 2 yr	TW lb/bu 2014	Plump % 2014	Protein* % 2014	Protein* % 2 yr
TWO ROW						
Conrad	83.9	93.0	50.0	94.3	13.6	13.0
AC Metcalfe	64.6	82.7	51.7	94.6	12.6	12.6
Rawson	58.1	79.2	49.3	97.3	12.3	12.5
Pinnacle	61.9	78.4	51.0	97.1	10.9	10.9
Conlon	58.9	67.8	51.6	97.2	12.5	12.6
Hockett	74.0	--	50.8	95.5	11.7	--
SIX ROW						
Innovation	74.6	89.3	51.2	97.1	12.3	12.4
Tradition	73.8	87.2	52.3	96.7	13.1	13.0
Lacey	66.1	83.7	52.2	96.2	13.3	12.8
Celebration	66.7	78.9	51.6	95.0	13.9	13.6
Stellar-ND	58.4	72.5	51.8	95.8	13.6	13.1
LSD 10%	11.59	--	0.68	1.38	0.84	--

Planted: May 22 **Harvested:** August 14
Previous Crop: Field Peas
^ Reported on a 13.5% moisture basis
* Reported on a 0% moisture basis

Oat Variety Descriptions

Variety	Origin[1]	Grain Color	Height	Maturity	Resistance To[2]				Quality Factors	
					Lodging	Stem Rust	Crown Rust	Barley Yellow Dwarf	Test Weight	Grain Protein
AC Pinnacle	Canada	White	Tall	Late	MS	R	R	S	Medium	Low
Beach	NDSU	White	Tall	M late	MR	S	MR/MS	MS	Medium	M high
CDC Dancer	Canada	White	Tall	Late	MR	S	MS	S	High	Medium
CDC Minstrel	Canada	White	Tall	Late	MR	S	S	S	M high	Medium
Furlong	Canada	Red	Tall	Late	MR	S	S	T	High	Medium
HiFi	NDSU	White	Tall	Late	MR	MR	R	T	M high	Medium
Horsepower	SDSU	White	Medium	E medium	R	MS	MR	MR	Medium	Medium
Hytest	SDSU	White	Tall	Early	MS	S	MS	S	V high	High
Jury	NDSU	White	Tall	Late	MS	R	R	MT	M high	Medium
Killdeer	NDSU	White	Med	Med	MR	S	MS	MT	M high	Medium
Leggett	Canada	White	Tall	Late	MR	MR	R	S	Medium	Medium
Morton	NDSU	White	Tall	Late	R	S	S	MT	High	Medium
Newburg	NDSU	White	Tall	Late	MS	R	R	MT	Medium	Medium
Otana	MT	White	Tall	Late	S	S	S	S	High	Medium
Paul	NDSU	Hulless	V tall	Late	MS	R	MR	T	V high	High
Rockford	NDSU	White	Tall	Late	R	S	R	MT	M high	Medium
Souris	NDSU	White	Med	Med	R	MS	R	MS	High	Medium
Stallion	SDSU	White	Tall	Late	M	S	MR	NA	High	Medium

[1] Refers to developer: NDSU = North Dakota State University; SDSU = South Dakota State University.

[2] R = resistant; MR = moderately resistant; M = intermediate; MS = moderately susceptible; S = susceptible; VS = very susceptible; T = tolerant; MT = moderately tolerant; NA = data not available.

Dryland Notill Oat
Williston, ND

Cultivar	Yield^ bu/a 2014	Yield^ bu/a 3 yr	TW lb/bu 2014	Protein* % 2014	Protein* % 3 yr
AC Pinnacle	106.0	97.8	39.0	10.3	13.5
Otana	92.1	88.0	38.2	12.1	15.2
Minstrel CDC	82.6	85.2	37.9	9.7	13.5
CDC Dancer	79.3	84.1	37.9	10.9	14.0
Horsepower	76.2	82.0	40.0	11.5	14.9
Newburg	80.8	81.8	37.3	11.6	14.6
Killdeer	67.6	79.3	38.5	11.0	14.5
Souris	72.0	79.0	38.6	11.0	14.4
Furlong	66.3	79.0	38.4	13.1	14.6
Morton	76.9	77.0	39.5	13.0	15.6
Rockford	72.6	75.7	39.1	12.2	15.6
Jury	78.3	75.7	38.9	11.7	16.3
Leggett	66.3	75.5	40.3	12.2	15.7
HiFi	64.7	74.8	39.2	12.3	15.2
Stallion	59.6	73.4	37.6	12.3	15.4
Beach	54.1	71.1	39.9	12.2	15.3
Hytest	52.6	61.4	40.9	14.9	17.8
Deon	81.1	--	39.2	12.4	--
Paul	33.4	--	46.3	18.7	--
LSD 10%	8.49	--	0.65	0.54	--

Planted: May 3 **Harvested:** August 8

Previous Crop: Green Peas

^ Reported on a 13.5% moisture basis

* Reported on a 0% moisture basis

"Choose a job you love and you'll never work a day in your life."

-Confuscius

Flax Variety Descriptions

VARIETY[1]	ORIGIN[2]	PVP[3]	RELATIVE MATURITY	SEED COLOR	PLANT HEIGHT	RESISTANCE TO WILT	RELATIVE YIELD
AC LIGHTNING	CANADA	NO	LATE	BROWN	M TALL	R	V GOOD
CARTER	NDSU	YES	MID	YELLOW	MEDIUM	MR	V GOOD
CDC ARRAS	CANADA	NO	MID	BROWN	MEDIUM	MR	GOOD
CDC BETHUME	CANADA	NO	M LATE	BROWN	M TALL	MR	V GOOD
CDC GLAS	CANADA		M LATE	BROWN	M TALL	MR	V GOOD
CDC SANCTUARY	CANADA		MID	BROWN	M TALL	MR	V GOOD
CDC SORREL	CANADA	NO	M LATE	BROWN	M TALL	MR	V GOOD
HANLEY	CANADA	NO	M EARLY	BROWN	MEDIUM	R	V GOOD
LINOTT	CANADA		M EARLY	BROWN	MEDIUM	MS/MR	V GOOD
MCGREGOR	CANADA		LATE	BROWN	MEDIUM	MR	GOOD
NECHE	NDSU	NO	MID	BROWN	MEDIUM	R	GOOD
NEKOMA	NDSU	NO	LATE	BROWN	MEDIUM	MR	V GOOD
OMEGA	NDSU	NO	MID	YELLOW	MEDIUM	MS	GOOD
PEMBINA	NDSU	NO	MID	BROWN	MEDIUM	MR	GOOD
PRAIRIE BLUE	CANADA	NO	M LATE	BROWN	MEDIUM	NA	GOOD
PRAIRIE GRANDE	CANADA	NO	M EARLY	BROWN	MEDIUM	MR	V GOOD
PRAIRIE SAPPHIRE	CANADA		MID	BROWN	MEDIUM	MR	GOOD
PRAIRIE THUNDER	CANADA	NO	MEDIUM	BROWN	SHORT	NA	GOOD
RAHAB 94	SDSU		MID	BROWN	MEDIUM	MR	V GOOD
SHAPE	CANADA		MID	BROWN	MEDIUM	R	GOOD
WEBSTER	SDSU	NO	LATE	BROWN	TALL	MR	GOOD
YORK	NDSU	NO	LATE	BROWN	MEDIUM	R	V GOOD

[1] All varieties have resistance to prevalent races of rust; all have good oil yield and oil quality.

[2] Refers to developer: NDSU = North Dakota State University; SD = South Dakota State University.

[3] PVP = Plant Variety Protection.

Dryland Notill Flax
Williston, ND

	Yield bu/a		TW lb/bu	Oil* %	
Cultivar	**2014**	**3 yr**	**2014**	**2014**	**3 yr**
YELLOW SEEDED					
GoldND	19.6	19.3	51.3	40.0	40.3
Carter	18.5	19.2	52.6	38.8	39.3
Omega	20.8	17.7	53.0	39.1	39.5
BROWN SEEDED					
CDC Sorrel	19.5	20.6	52.2	39.4	40.2
Neche	20.6	19.7	53.0	39.0	39.6
York	18.9	19.1	52.8	38.5	39.1
Prairie Blue	20.3	19.0	52.5	40.1	40.3
Rahab 94	19.5	18.8	51.8	39.7	39.9
CDC Arras	18.8	18.7	52.7	38.6	39.4
CDC Sanctuary	18.5	18.7	52.1	39.0	39.8
AC Lightning	19.3	18.7	52.8	39.2	39.8
Hanley	18.5	18.7	52.8	38.7	39.1
Nekoma	20.0	18.6	52.8	39.6	40.0
Linott	18.8	18.4	52.8	38.2	38.6
CDC Glas	18.8	18.2	50.7	39.6	40.4
Prairie Thunder	18.4	17.8	52.9	38.5	38.9
Prairie Sapphire	17.4	17.8	51.8	40.5	41.4
McGregor	17.7	17.7	53.2	38.7	39.3
Prairie Grande	17.5	17.5	52.5	39.0	39.6
CDC Bethume	18.2	17.4	52.7	38.7	39.4
Pembina	16.7	17.2	52.6	38.9	39.8
Webster	16.2	17.2	52.4	39.3	40.2
Shape	17.5	17.1	52.3	40.1	41.2
Neela	18.1	--	51.5	39.3	--
Bison	17.6	--	52.7	38.9	--
LSD 10%	3.3	--	0.7	0.3	--

Planted: May 9 **Harvested:** September 16

Previous Crop: Durum

*Oil adjusted to 9% moisture

Safflower Variety Descriptions

Variety	Origin[1]	PVP[2]	Hull Type[3]	Oil Type[4]	Irrigated Yield[5]	Dryland Yield[5]	TWT[5]	Oil[5]	Maturity	Tolerance[6]	
										Alt	BB
Cardinal	MSU/NDSU	YES	N	HIGH LINO	V GOOD	V GOOD	HIGH	FAIR	MED	T	MT
Finch	MSU/NDSU	NO	N	LINO	GOOD	V GOOD	V HIGH	FAIR	M EARLY	MS	T
Hybrid 1601	STI	YES	STP	HIGH OLEIC	V GOOD	V GOOD	MED	GOOD	M LATE	MT	MT
Hybrid 9049	STI	YES	N	HIGH OLEIC	V GOOD	V GOOD	V HIGH	FAIR	MED	MT	MT
MonDak	MSU/NDSU	YES	N	HIGH OLEIC	GOOD	V GOOD	HIGH	FAIR	M EARLY	T	MT
Montola 2000	MSU/NDSU	YES	N	HIGH OLEIC	M GOOD	GOOD	MED	GOOD	EARLY	MS	MS
Montola 2001	MSU/NDSU	YES	STP	HIGH OLEIC	GOOD	FAIR	MED	GOOD	MED	MT	MT
Montola 2003	MT/NDSU	YES	N	HIGH OLEIC	V GOOD	V GOOD	M HIGH	GOOD	M EARLY	MT	MT
Montola 2004	MSU/NDSU	YES	N	HIGH OLEIC	GOOD	GOOD	M HIGH	GOOD	M EARLY	MS	MT
Morlin	MSU/NDSU	YES	STP	HIGH LINO	V GOOD	GOOD	MED	GOOD	M LATE	T	T
NutraSaff	MSU/NDSU	YES	RED	LINO	GOOD	GOOD	MED	HIGH	MED	T	MT

[1] Refers to developer: MSU = Montana State University; NDSU = North Dakota State University; STI = Safflower Technologies International.

[2] PVP = Plant Variety Protection. "YES" indicates that the variety is protected and the seed may be sold for planting purposes only as a class of certified seed (Title V option).

[3] STP = striped, N = normal, RED = reduced.

[4] Lino = linoleic.

[5] Relative ratings of yield, test weight, and oil will vary under conditions of moderate-severe disease infestation.

[6] Alt = Alternaria leaf spot disease, BB = bacterial blight, S = susceptible, MS = moderately susceptible, MT = moderately tolerant, T = tolerant.

Dryland Fallow Safflower
Sidney, MT

Cultivar	Yield lb/a 2014	Yield lb/a 3 yr**	TW lb/bu 2014	Oil* % 2014	Oil* % 3 yr**
Hybrid 1601	1327	2023	34.2	38.9	38.8
Cardinal	1377	1920	39.4	35.1	36.6
Montola 2003	1149	1874	37.5	37.5	39.1
MonDak	1373	1827	38.8	34.4	36.0
Hybrid 9049	1311	1714	39.9	31.4	32.4
Finch	1097	1552	38.4	35.8	37.6
Morlin	1192	1487	35.6	37.2	39.1
NutraSaff	961	1362	32.9	48.1	49.8
STI 1201	880	--	33.9	39.3	--
LSD 10%	185.3	--	0.64	0.42	--

Planted: May 12 **Harvested:** September 17

*Oil reported on oven dried basis

3yr** = Average of 2010, 2011 & 2014 . 2012 crop yields were drastically reduced by grasshoppers. 2013 crop was destroyed by hail.

Dryland Notill Safflower
Williston, ND

Cultivar	Yield lb/a 2014	Yield lb/a 3 yr	TW lb/bu 2014	Oil* % 2014	Oil* % 3 yr
Cardinal	1331	1818	40.3	32.5	34.8
MonDak	1310	1707	40.2	35.2	36.1
Hybrid 1601	1183	1641	35.4	38.5	38.4
Montola 2003	1218	1543	40.4	37.6	38.3
Hybrid 9049	1435	1516	40.3	30.5	31.1
Finch	974	1340	40.1	33.7	36.1
Morlin	1098	1216	37.2	33.7	37.2
NutraSaff	908	1197	34.8	43.3	46.5
STI 1201	1173	--	36.4	43.4	--
LSD 10%	233.5	--	1.12	0.75	--

Planted: May 3 **Harvested:** September 8

Previous Crop: Spring Wheat

*Oil reported on oven dried basis

Sprinkler Irrigated Safflower[1,2]
Nesson Valley, ND

Cultivar	Yield lb/a 2014	Yield lb/a 3 yr	TW lb/bu 2014	Oil* % 2014	Oil* % 3 yr
Hybrid 200	1681	1766	37.4	27.4	29.9
Montola 2003	1747	1716	33.2	30.1	33.6
MonDak	1593	1578	37.8	31.0	31.9
Cardinal	1427	1514	37.1	28.1	30.7
Hybrid 1601	1074	1507	31.1	32.4	33.7
Hybrid 9049	1572	1487	36.6	26.3	28.2
Hybrid 528	1162	1441	29.8	37.8	40.4
Morlin	1039	1261	31.5	30.6	33.8
Finch	1238	1209	37.3	31.4	32.2
NutraSaff	788	1012	30.5	40.3	43.9
LSD 10%	436	--	2.9	7.0	--

Planted: May 30 **Harvested:** October 8
Previous Crop: Durum
[1]Hail damage occurred on September 3, 2014
[2]Hard freeze occurred on September 9, 2014

Dryland Notill Safflower
Arnegard, ND

Cultivar	Yield lb/a 2014	TW lb/bu 2014	Oil* % 2014
Hybrid 1601	729	33.5	34.3
Hybrid 9049	890	37.6	23.3
MonDak	1110	38.5	28.8
Montola 2003	1146	37.5	30.1
Cardinal	1508	39.3	28.2
Finch	975	39.2	30.2
NutraSaff	731	34.2	43.0
Morlin	898	33.0	31.3
LSD 10%	424.7	1.34	2.13

Planted: May 14 **Harvested:** September 23
Previous Crop: Barley
*Oil reported on oven dried basis

Dryland Notill Roundup Ready Canola
Williston, ND

Brand	Cultivar	Yield lb/a 2014	Yield lb/a 3 yr	Oil* % 2014	Oil* % 3 yr
CP	HyCLASS 955	1346	1359	43.9	44.5
BY	6070 RR	1636	1339	44.7	43.5
IW	7150	1410	1315	45.1	45.6
CP	HyCLASS 930	1287	1213	43.3	45.2
SS	Star 402	1475	--	44.6	--
BY	6044 RR	1425	--	43.8	--
CA	09H7757	1340	--	44.4	--
CA	08H0004	1245	--	43.5	--
CP	HyCLASS 969	1216	--	43.6	--
CA	V12-1	1212	--	43.4	--
LSD 10%		274.9	--	1.61	--

Planted: May 6 **Harvested:** Aug 13
Previous Crop: Durum
*Oil adjusted to 8.5% moisture
BY=BrettYoung, CA=Cargill, CP=Croplan, IW=Integra/Wilbur Ellis, SS=Star Specialty Seed

Jerald Bergman
WREC Director
Speaking during EARC Field Day

Dryland Notill Roundup Ready Soybean
Williston, ND

Company	Cultivar	Maturity Group*	Yield bu/a		Oil** %		Protein***
			2014	2 yr	2014	2 yr	2014
NuT/G2G	7063	0.6	32.0	30.7	15.9	17.1	29.9
S/NK	S04-D3	0.4	29.5	29.1	14.9	16.7	32.6
IN	20090	00.9	29.5	29.0	15.6	17.1	31.3
S/NK	S00-A7	00.7	25.2	28.6	16.2	17.6	32.9
NuT/G2G	6021	0.2	23.6	27.7	15.5	17.3	32.2
S/NK	S02-B4	0.2	26.5	27.0	15.6	17.2	31.2
LS	LS0334 RR2	0.3	29.6	--	14.4	--	31.7
DGS	S04RY55	0.4	29.5	--	14.4	--	33.0
LS	LS0214 RR2	0.2	27.9	--	15.3	--	31.7
DGS	S02RY74	0.2	27.7	--	14.7	--	31.9
LS	LS0134 RR2	0.1	27.5	--	14.4	--	33.8
IN	20126	0.1	26.2	--	15.1	--	31.8
PFS	14R02	0.2	25.9	--	14.7	--	31.6
REA	55G14	00.5	24.5	--	15.2	--	33.5
PFS	15R04	0.4	24.2	--	14.6	--	31.1
IN	20109	0.1	23.8	--	14.8	--	32.4
LS	LS00834 RR2	00.8	23.6	--	15.3	--	32.1
DGS	S06RY24	0.6	23.4	--	14.1	--	33.2
LS	LS00734 NRR2	00.7	22.9	--	15.4	--	32.8
NuT/G2G	6036	0.3	22.6	--	15.2	--	31.2
PFS	14R008	00.8	22.1	--	15.3	--	31.8
REA	58G82	00.8	21.0	--	15.2	--	31.6
NuT/G2G	6007	00.7	18.9	--	15.9	--	32.8
NuT/G2G	6000	0.0	17.6	--	15.9	--	31.4
LSD 10%			3.50	--	0.20	--	1.00

Planted: May 23 **Harvested:** September 29

Previous Crop: Durum

*Maturity group provided by company

**Oil adjusted to 13% moisture

***Protein adjusted to 13% moisture

DGS=Dyna-Gro Seed, IN=Integra, LS=Legacy Seeds, NuT/G2G=NuTech/G2 Genetics, PFS=Peterson Farms Seed, REA=REA Hybrids, S/NK=Syngenta/NK

Sprinkler Irrigated Roundup Ready Soybean[1,2]
Nesson Valley, ND

Company	Cultivar	Maturity Group	Yield bu/a	TW lb/bu
SYN	S00-A7	00.7	51.1	56.9
SYN	S02-B4	0.2	49.8	57.7
LS	LS00834 RR2	00.8	49.6	57.0
PFS	14R008	00.8	49.5	57.2
DGS	S02RY74	0.2	49.1	57.1
WE/IS	20215	0.1	49.1	57.6
REA	55G14	00.5	45.9	58.0
REA	61G24	0.1	45.0	58.0
NuT/G2G	7063	0.6	44.8	57.2
LS	LS00734 NRR2	00.7	43.6	57.7
LS	LS0214 RR2	0.2	43.1	57.7
WE/IS	20090	00.9	43.1	57.5
SYN	S04-D3	0.4	42.9	57.4
NuT/G2G	6021	0.2	42.7	57.5
NuT/G2G	6007	00.7	41.0	57.0
LS	LS0134 RR2	0.1	40.8	57.2
PFS	15R04	0.4	40.6	56.8
REA	58G82	00.8	40.6	57.9
NuT/G2G	6000	0.0	38.7	57.3
WE/IS	20109	0.1	38.5	56.8
WE/IS	20300	0.3	38.5	57.6
PFS	14R02	0.2	38.4	56.9
REA	62G22	0.2	38.1	57.8
LS	LS0334 RR2	0.3	35.5	58.0
NuT/G2G	6036	0.3	34.3	56.0
DGS	S06RY24	0.6	28.8	56.3
LSD 10%		--	4.9	0.6

Planted: May 22, 2014 **Harvested:** Oct. 7, 2014

Previous Crop: Barley

[1]Hail damage occurred on September 3, 2014

[2]Hard freeze occurred on September 9, 2014

No varieties reached physiological maturity prior to hard freeze

*Maturity group provided by company

SYN=Syngenta; LS=Legacy Seeds; PFS=Peterson Farms Seed; DGS=Dyno-Gro Seed; WE/IS=Wilbur Ellis Co./Integra Seed; REA=REA Hybrids; NuT/G2G=Nu Tech Seed/G2 Genetics

Sprinkler Irrigated Conventional Soybean[1,2]
Nesson Valley, ND

Company	Cultivar	Maturity Group	Yield bu/a	TW lb/bu
NDSU	Ashtabula	0.4	31.1	56.3
NDSU	Cavalier	00.7	29.0	57.2
NDSU	Traill	0.0	28.3	57.8
NDSU	Sheyenne	0.8	26.2	57.5
LSD 10%		--	4.3	0.2

Planted: May 22 **Harvested:** Oct. 7

Previous Crop: Barley

[1]Hail damage occurred on September 3, 2014

[2]Hard freeze occurred on September 9, 2014

No varieties reached physiological maturity prior to hard freeze

Dryland Notill Roundup Ready Corn
Williston, ND

Brand	Cultivar	Maturity*	Yield bu/a 2014	Yield bu/a 2 yr	TW lb/bu 2014	Harvest Moisture %
NuT/G2G	3F-775	75	59.5	81.6	54.0	13.9
S/NK	N08N	77	65.8	74.7	53.2	15.4
S/NK	N09V	79	53.8	70.6	55.7	15.5
NuT	5N-183	83	60.5	67.5	50.8	16.3
S/NK	N07H	77	41.5	59.6	53.9	14.6
NUS	8001 VT2P	80	77.0	--	55.8	16.6
NuT/G2G	5Z-379	79	75.7	--	52.8	15.3
NuT/G2G	3F-781	81	66.6	--	53.8	15.4
DGS	D25VC66	85	66.6	--	52.1	16.5
LS	L2314 VT2PRO	83	65.6	--	53.3	15.4
PFS	71D83	83	64.1	--	55.9	16.3
BRH	09R19	79	63.9	--	56.9	14.9
IW	2803VT2PRO	78	62.3	--	54.9	16.0
IW	9301VT2PRIB	80	59.3	--	55.3	16.2
NUS	2771 GT	77	58.8	--	50.9	14.0
LS	L2213 VT2PRO	82	57.5	--	56.7	15.3
IW	3142VT3PRIB	81	56.9	--	54.8	15.6
PFS	71N78	78	56.4	--	55.0	15.4
IW	9272R	77	54.4	--	57.3	15.4
LS	L1814 VT2PRO	79	50.2	--	56.3	14.8
LS	L1943 VT2PRO	81	48.8	--	54.2	16.6
DGS	D23VC35	83	47.5	--	51.1	17.5
DGS	D21VC68	81	41.0	--	52.5	16.3
NUS	2754 GT	75	40.9	--	51.7	13.7
LSD 10%			9.39	--	1.05	0.55

Planted: May 22 **Harvested:** October 15

Previous Crop: Durum

*Maturity group provided by company

BRH=Blue River Hybrids, DGS=Dyna-Gro Seed, IW=Integra/Wilbur Eliis, LS=Legacy Seeds, NUS=Nuseed, NuT=NuTech, NuT/G2G=NuTech/G2 Genetics, PFS=Peterson Farms Seed, S/NK=Syngenta/NK

Sprinkler Irrigated Roundup Ready Corn
Nesson Valley, ND

Cultivar	Brand	Yield bu/a 2014	Yield bu/a 2 yr	TW lb/bu 2014	Harvest Moisture %
D23VC35	Dyna-Gro	174.1	177.5	51.5	13.7
1B801-RIB	REA	187.7	177.1	53.1	13.8
2B850-RIB	REA	171.4	169.6	51.9	14.1
5N-183	NuTech	166.8	166.5	51.2	13.2
2B830-RIB	REA	174.1	160.7	52.3	14.8
71C80	Peterson	156.3	152.2	52.7	14.9
D25VC66	Dyna-Gro	186.6	--	52.8	14.4
L1814 VT2PRO	Legacy	184.2	--	53.3	13.8
5Z-379	NuTech	182.5	--	52.0	14.8
3537VT2PRO	Integra	182.3	--	52.2	14.4
L2213 VT2PRO	Legacy	181.2	--	52.9	13.9
71N78	Peterson	179.4	--	51.3	14.9
2803VT2PRO	Integra	177.0	--	52.1	15.2
1B820-RIB	REA	175.9	--	52.1	14.0
2771 GT	Nuseed	174.5	--	50.8	14.4
3F-781	NuTech	173.5	--	51.1	13.8
71D83	Peterson	171.6	--	53.3	14.4
3F-775	NuTech	171.0	--	51.2	14.0
2A550-RIB	REA	170.7	--	50.9	15.9
D21VC68	Dyna-Gro	168.7	--	51.3	15.0
L1943 VT2PRO RIB	Legacy	168.4	--	52.2	14.4
09R19	Blue River	167.5	--	55.0	13.8
3142VT3PRIB	Integra	166.6	--	52.5	15.2
L2314 VT2PRO	Legacy	166.1	--	51.9	14.0
9301VT2PRIB	Integra	163.7	--	53.5	14.0
8001 VT2P	Nuseed	159.1	--	55.9	14.4
92E84	Peterson	150.3	--	50.1	15.8
2754 GT	Nuseed	148.9	--	51.7	14.4
LSD 10%		18.9	--	1.2	1.3

Planted: May 23 **Harvested:** October 14

Previous Crop: Barley

Sprinkler Irrigated Dry Bean
Sidney, MT

Cultivar	Bean Type	Yield cwt/a 2014	Yield cwt/a 2 yr	TW lb/bu 2014	SW[1] gm 2014
Majesty	DRK	39.5	36.7	60.5	72.1
Othello	P	42.6	39.4	58.3	41.2
Rosetta	PN	39.2	34.8	62.5	34.7
California Early	LRK	30.1	30.0	57.0	51.5
Powderhorn	GN	47.3	--	58.8	40.2
Talon	DRK	37.5	--	59.5	55.1
Rosie	LRK	35.3	--	60.8	49.6
Inferno	LRK	35.2	--	62.3	54.5
El Dorado	P	39.8	--	61.0	43.2
Yeti	WK	39.2	--	63.5	57.5
Gypsy Rose	FDM	37.8	--	64.3	29.0
Fathom	N	40.2	--	66.3	23.3
Snowdon	WK	28.4	--	60.8	63.4
LSD 5%		6.8		1.8	

Planted: May 23 **Harvested:** Sep 17

[1]100-seed weight

Previous crop: Sugarbeet

Type: P=pinto, N=navy, LRK=light red kidney, DRK=dark red kidney,
WK=white kidney, PN=pink, GN=great northern, FDM=Flor de Mayo

Corn
Nesson Valley

Dryland Notill Sunflower
Williston, ND

Company	Hybrid	Yield lb/a 2014	Yield lb/a 2 yr	TW lb/bu 2014	Oil* % 2014	Oil* % 2 yr
OIL						
NuA	Talon - EX, NU	1988	1841	25.0	29.9	34.2
NuA	Cobalt II - CL, HO, DM	1677	1818	30.3	31.3	37.2
GE	12E12 - CL, HO, DM	1629	1793	25.0	28.1	33.1
NuA	Hornet - CL, HO, DM	1851	1776	27.2	31.8	37.1
NuA	Camaro II - CL, NU, DM	1631	1688	28.8	31.0	35.9
GE	12G20 - CL, HO	1268	1666	27.0	30.7	36.3
GE	12E13 - CL, HO, DM	1503	1652	25.3	29.6	34.5
NuA	Falcon - EX, NU	1547	1641	27.3	30.1	35.1
GE	12E14 - CL, HO, DM	1567	1579	23.5	29.1	34.7
GE	11G08 - NU	1274	1403	26.8	30.2	33.6
NuT	69M2 - EX, TR, DM	1906	--	28.0	32.1	--
GE	12E06 - HO, DM	1761	--	29.7	30.9	--
NuT	68H7 - EX, HO, DM	1624	--	32.0	30.6	--
GE	12G25 - CL, HO	1575	--	27.7	32.9	--
CONFECTION						
NuA	Badger DMR - CL, DM	1759	--	26.9	26.0	--
NuA	Badger - CL	1649	--	28.2	27.9	--
NuA	Badger HO - CL, DM	1106	--	25.6	25.5	--
LSD 10%		456.10	--	0.86	1.01	--

Planted: June 3 **Harvested:** October 7

Previous Crop: Durum

*Oil adjusted to 10% moisture

GE=Genosys, NuA=Nuseed Americas, NuT=NuTech

CL=Clearfield, EX=Express

NS=NuSun Hybrid, HO=High Oleic, TR=Traditional

DM=Downy Mildew Resistance

LENTIL VARIETY DESCRIPTIONS

Variety	Origin[1]	Seed Color	Relative Maturity	Relative Height	Seed Size	Resistance To: Ascochyta	Resistance To: Anthracnose
Avondale	USDA	GREEN	MEDIUM	TALL	MEDIUM	NA	NA
CDC Greenland	Canada	GREEN	EARLY	MEDIUM	V LARGE	R	S
CDC Imigreen*	Canada	GREEN	MEDIUM	MEDIUM	LARGE	R	S
CDC Impala*	Canada	RED	EARLY	SHORT	EXTRA SMALL	R	R
CDC Impact*	Canada	RED	LATE	SHORT	SMALL	NA	NA
CDC Impress*	Canada	GREEN	M LATE	SHORT	LARGE	R	NA
CDC LeMay	Canada	GREEN	EARLY	SHORT	SMALL	MS	S
CDC Maxim*	Canada	RED	M EARLY	MEDIUM	SMALL	R	R
CDC Redberry	Canada	RED	MEDIUM	MEDIUM	SMALL	R	R
CDC Redcoat	Canada	RED	M LATE	TALL	LARGE	R	R
CDC Red Rider	Canada	RED	M EARLY	MEDIUM	SMALL	MR	MS
CDC Richlea	Canada	GREEN	M LATE	MEDIUM	MEDIUM	S	S
CDC Rosetown	Canada	RED	EARLY	SHORT	SMALL	MR	MR
CDC Rouleau	Canada	RED	MEDIUM	MEDIUM	SMALL	MR	MS
CDC Viceroy	Canada	GREEN	M EARLY	MEDIUM	SMALL	R	MR
Crimson	USDA	RED	EARLY	M SHORT	SMALL	S	S
Essex	USDA	GREEN	MEDIUM	M TALL	MEDIUM	NA	S
Eston	Canada	GREEN	EARLY	MEDIUM	SMALL	S	S
Merritt	USDA	GREEN	M LATE	MEDIUM	LARGE	NA	NA
Morena	USDA	BROWN	EARLY	TALL	SMALL	NA	S
Pardina	Spain	BROWN	EARLY	SHORT	SMALL		NA
Pennell	USDA	GREEN	MEDIUM	MEDIUM	LARGE	NA	S
Riveland	USDA	GREEN	M LATE	TALL	V LARGE	NA	S

[1] Refers to developer: USDA = United States Department of Agriculture. * Clearfield lentil with imidazolinone tolerance.

Dryland Fallow Lentil
Sidney, MT

Cultivar	Type	Yield lb/a 2014	Yield lb/a 3 yr	Test wt lb/bu 20124	100-seed wt gm 2014	100-seed wt gm 3 yr
Essex	green	1056	1173	64.4	4.2	4.3
Avondale	green	981	1157	63.5	4.7	4.8
CDC Richlea	green	1169	1138	62.6	4.8	5.0
CDC Greenland	green	975	1097	62.5	6.0	6.2
CDC Redberry	red	866	1043	64.3	4.1	4.0
Morena	brown	867	1029	65.0	3.6	3.7
Eston	green	968	998	64.8	3.5	3.4
Riveland	green	821	958	60.6	6.4	6.7
CDC Impact	red	1088	856	65.0	3.2	3.4
Merrit	green	704	840	61.8	5.1	5.8
Crimson	red	946	812	64.4	3.4	3.4
Viceroy	green	1058	--	64.8	3.3	
Pardina	brown	971	--	64.8	3.6	
Impress CL	green	966	--	63.1	4.8	
Red Coats	red	839	--	64.3	3.9	
Imi-green	green	737	--	62.9	5.8	
LSD 5%		136		0.7		

Planted: Apr 23 **Harvested:** Aug 1

Dryland Notill Lentil
Crosby, ND

Cultivar	Yield lb/a 2014	Yield lb/a 2 yr*	TW lb/bu 2014
LARGE GREEN			
CDC Greenland	1839	1276	55.9
Pennell	1689	1205	55.7
MEDIUM GREEN			
CDC Richlea	1876	1409	54.2
SMALL GREEN			
CDC Viceroy	1897	1465	57.3
Essex	1524	1174	54.9
SMALL RED			
CDC Red Rider	1941	1427	55.9
CDC Redberry	1970	1394	57.8
FRENCH GREEN			
CDC Lemay	2067	1498	57.3
LSD 10%	406.7	--	1.77

Planted: May 23 **Harvested:** September 18
Previous Crop: Durum
2yr* = Average of 2012 & 2014

Dryland Notill Lentil
Williston, ND

Cultivar	Yield lb/a 2014	Yield lb/a 3 yr	TW lb/bu 2014
LARGE GREEN			
CDC Greenland	1224	1384	58.5
Pennell	1215	1370	59.2
Riveland	1119	1229	56.8
MEDIUM GREEN			
CDC Richlea	1230	1411	59.4
Avondale	1190	--	59.8
Merrit	970	--	59.1
SMALL GREEN			
Essex	1355	1541	61.6
CDC Viceroy	1110	1374	62.4
Eston	1136	--	62.4
SMALL RED			
CDC Red Rider	1304	1465	61.9
CDC Redberry	1186	1405	61.9
CDC Rosetown	1097	1331	62.4
CDC Rouleau	1310	1295	60.7
CDC Redcoat	1263	--	62.5
Crimson	972	--	62.8
FRENCH GREEN			
CDC Lemay	1170	1347	61.4
SPANISH BROWN			
Morena	1228	1400	62.8
LSD 10%	189.3	--	0.7

Planted: May 8 **Harvested:** August 19
Previous Crop: Durum

Dryland Notill Lentil
Beach, ND

Cultivar	Yield lb/a 2014	Yield lb/a 2 yr	TW lb/bu 2014
LARGE GREEN			
CDC Greenland	1669	2019	47.9
Pennell	1898	2121	49.7
MEDIUM GREEN			
CDC Richlea	2098	2497	51.0
SMALL GREEN			
Essex	1336	2329	50.0
CDC Viceroy	1679	2410	52.6
SMALL RED			
CDC Red Rider	2003	2530	52.2
CDC Redberry	1922	2374	52.6
FRENCH GREEN			
CDC Lemay	1612	2358	52.5
LSD 10%	255.6	--	1.68

Planted: May 22 **Harvested:** October 9
Previous Crop: Field Peas

Dryland Notill Lentil
Arnegard, ND

Cultivar	Yield lb/a 2014	TW lb/bu 2014
LARGE GREEN		
CDC Greenland	1306	47.6
Pennell	1515	48.8
MEDIUM GREEN		
CDC Richlea	1205	51.1
SMALL GREEN		
Essex	1470	52.8
CDC Viceroy	1336	51.9
SMALL RED		
CDC Red Rider	1491	50.1
CDC Redberry	1188	50.9
FRENCH GREEN		
CDC Lemay	1042	50.7
LSD 10%	242.5	1.71

Planted: May 14 **Harvested:** October 14
Previous Crop: Barley

Dryland Notill Clearfield Lentil
Williston, ND

Cultivar	Yield lb/a 2014	Yield lb/a 3 yr	TW lb/bu 2014
MEDIUM GREEN			
CDC Impress CL	780	1261	61.8
CDC Imigreen CL	267	1047	61.4
SMALL RED			
CDC Maxim CL	679	1109	62.8
EXTRA SMALL RED			
CDC Impala CL	550	1197	63.3
LSD 10%	193.9	--	0.27

Planted: May 8 **Harvested:** August 18
Previous Crop: Durum

Dryland Notill Clearfield Lentil
Crosby, ND

Cultivar	Yield lb/a 2014	Yield lb/a 3 yr	TW lb/bu 2014
MEDIUM GREEN			
CDC Impress CL	987	1448	58.8
CDC Imigreen CL	732	1352	57.1
SMALL RED			
CDC Maxim CL	1748	2027	60.6
EXTRA SMALL RED			
CDC Impala CL	1945	1869	60.6
LSD 10%	521.5	--	1.5

Planted: May 23 **Harvested:** September 18
Previous Crop: Durum

Dryland Notill Clearfield Lentil
Beach, ND

Cultivar	Yield lb/a 2014	TW lb/bu 2014
MEDIUM GREEN		
CDC Impress CL	1005	53.9
CDC Imigreen CL	1172	53.0
SMALL RED		
CDC Maxim CL	1313	52.0
EXTRA SMALL RED		
CDC Impala CL	1252	55.6
LSD 10%	269.8	2.16

Planted: May 22 **Harvested:** October 9
Previous Crop: Peas

FIELD PEA VARIETY DESCRIPTIONS

Variety	Origin	Vine Habit[1]	Growth Habit[2]	Vine Length	Relative Maturity	Seed Size	Resistance to Powdery Mildew
Yellow Cotyledon							
AC Agassiz	AC	SL	SD	TALL	MEDIUM	MEDIUM	R
AC Earlystar	AC	SL	SD	TALL	EARLY	MEDIUM	R
Bridger	Legume Logic	SL	SD	MEDIUM	MEDIUM	MEDIUM	MS
CDC Leroy	CDC	SL	SD	M SHORT	MED LATE	SMALL	R
CDC Meadow	CDC	SL	SD	MEDIUM	EARLY	MEDIUM	R
CDC Treasure	CDC	SL	SD	MEDIUM	EARLY	SMALL	R
Delta	Limagrain	SL	SD	MEDIUM	MEDIUM	MEDIUM	MR
DS Admiral	Danisco	SL	SD	TALL	MEDIUM	LARGE	R
Jetset	Meridian	SL	SD	MEDIUM	Medium	M SMALL	R
Korando	Pulse USA	SL	SD	MEDIUM	EARLY	MEDIUM	R
Montech 4152	Montech	SL	SD	MEDIUM	EARLY	LARGE	NA
Mystique	Pulse USA	SL	SD	M SHORT	M LATE	M SMALL	MR
Spider	Nickerson	SL	SD	MEDIUM	MEDIUM	LARGE	R
SW Midas	Sweden	SL	SD	SHORT	M LATE	SMALL	R
SW Trapeze	Sweden	SL	SD	M SHORT	MEDIUM	MEDIUM	NA
Vegas	Pulse USA	SL	SD	SHORT	M LATE	LARGE	NA
Green Cotyledon							
Aragorn	Progene	SL	SD	M SHORT	M EARLY	M LARGE	NA
Arcadia	Pulse USA	SL	SD	MEDIUM	EARLY	SMALL	MS
CDC Striker	Canada	SL	SD	MEDIUM	MEDIUM	M LARGE	S
Cruiser	WA	SL	SD	MEDIUM	MEDIUM	M SMALL	S
Daytona	Meridian	SL	SD	MEDIUM	LATE	MEDIUM	R
K-2	Legume Logic	SL	SD	MEDIUM	EARLY	M SMALLL	S
Majoret	Sweden	SL	SD	MEDIUM	M LATE	MEDIUM	S
Stirling	WA	SL	SD	SHORT	EARLY	MEDIUM	R
Viper	Pulse USA	SL	SD	M SHORT	M EARLY	MEDIUM	MR

[1] SL=semi-leafless. [2] SD=semi-dwarf.

Field Peas

WREC

Dryland Fallow Field Pea
Sidney, MT

Cultivar	type	Yield lb/a 2014	Yield lb/a 3 yr	Test WT lb/bu 2014	100-seed wt gm 2014	100-seed wt gm 3 yr
SW Midas	Yellow	3072	2409	65.4	20.8	20.2
Arcadia	Green	2573	2214	65.0	20.6	20.0
Montech 4152	Yellow	2520	2188	66.1	24.8	24.6
DS Admiral	Green	2692	2121	65.6	23.0	23.2
Majoret	Green	2701	2089	66.6	23.7	22.8
Bridger	Yellow	1982	2075	65.5	21.3	21.5
CDC Striker	Green	2592	1974	65.8	23.6	22.8
Cruiser	Green	2439	1953	63.9	20.2	20.2
Earlystar	Yellow	2857	--	64.9	21.2	--
CDC Leroy	Yellow	2838	--	66.3	16.2	--
Jet Set	Yellow	2703	--	65.0	21.2	--
CDC Treasure	Yellow	2635	--	65.9	21.4	--
Aragorn	Green	2441	--	64.3	21.0	--
Daytona	Green	2441	--	65.5	25.8	--
Agassiz	Yellow	2435	--	65.3	21.8	--
LSD 5%		311.7		0.7	9.1	--

Planted: April 23 **Harvested:** July 31

Irrigated Field Pea
Nesson Valley, ND

Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Protein* % 2014	Protein* % 3 yr
YELLOW COTYLEDON TYPE					
DS Admiral	45.6	59.6	65.2	27.1	24.8
Agassiz	44.0	58.1	65.2	28.9	26.3
CDC Meadow	46.0	--	66.1	28.6	--
GREEN COTYLEDON TYPE					
Majoret	48.5	61.2	65.5	31.0	27.3
CDC Striker	40.5	60.3	64.9	28.6	25.3
Cruiser	42.1	58.7	63.9	29.5	26.4
LSD 10%	n.s.	--	0.4	0.9	--

Planted: May 21 **Harvested:** August 15
Previous Crop: Soybean
*Protein adjusted to 0% moisture basis

Dryland Notill Field Pea
Williston, ND

Cultivar	Yield bu/a 2014	Yield bu/a 3 yr	TW lb/bu 2014	Protein* % 2014	Protein* % 3 yr
YELLOW COTYLEDON TYPE					
CDC Mead-	52.3	43.6	65.7	25.8	26.2
Navarro	49.5	42.3	63.4	27.3	28.0
DS Admiral	51.4	41.6	64.7	25.3	26.8
Nette	51.3	41.5	65.5	24.7	25.9
Bridger	45.6	41.2	64.4	26.8	27.3
SW Midas	45.3	40.8	65.0	25.0	26.5
Agassiz	50.9	40.4	64.2	26.0	26.9
Mystique	43.0	39.7	64.3	27.5	27.8
Salamanca	45.5	39.1	63.8	28.0	28.4
Korando	47.9	38.4	63.5	27.8	28.2
Spider	48.1	38.3	65.3	26.8	27.6
Trapeze	44.0	38.3	62.9	26.5	27.4
Torch	42.5	38.1	64.9	26.8	27.5
Vegas	44.8	37.5	64.6	27.3	28.0
Gunner	46.2	35.4	65.2	26.3	26.9
LN4228	55.4	--	65.5	26.7	--
Yellowstone	51.8	--	64.1	26.5	--
LN4236	51.2	--	63.1	26.8	--
N08056-092	50.9	--	63.8	26.0	--
CM3404	50.1	--	64.7	25.3	--
Jetset	49.7	--	65.0	26.3	--
Earlystar	48.7	--	64.9	25.0	--
N08056-099	48.7	--	63.5	28.0	--
PUSA 11002	47.5	--	64.5	27.8	--
Quantim	46.9	--	64.7	27.5	--
Abarth	46.8	--	63.2	25.3	--
CM1609	46.7	--	65.4	25.0	--
Durwood	46.2	--	65.2	24.8	--
UN F377	45.9	--	63.8	26.0	--
Hyline	45.7	--	65.3	25.7	--
PUSA EXP 1300	38.2	--	65.4	28.5	--
GREEN COTYLEDON TYPE					
Arcadia	50.4	41.7	64.4	26.5	26.8
Bluemoon	45.5	40.9	64.1	26.0	27.2
CDC Striker	45.0	39.5	64.0	26.0	26.6
Shamrock	44.5	39.4	64.4	25.8	26.0
Viper	43.1	38.4	64.1	26.3	27.3
Cruiser	45.3	36.9	63.4	25.8	27.5
Majoret	43.4	36.3	65.2	27.3	28.1
K2	43.5	35.6	64.2	26.0	27.1
Aragorn	41.5	34.7	63.3	26.0	27.4
Ginny	55.2	--	64.3	25.3	--
LN1123	46.7	--	65.8	24.5	--
LN 1123	45.5	--	65.8	24.5	--
Daytona	44.9	--	64.3	26.8	--
Greenwood	44.6	--	65.6	23.0	--
LN1115	44.1	--	65.3	26.5	--
LN1109	44.3	--	64.8	25.0	--
LSD 10%	6.0	--	0.4	0.8	--

Planted: May 8 **Harvested:** August 12
Previous Crop: Durum
*Protein adjusted to 0% moisture

Dryland Notill Field Pea
Crosby, ND

Cultivar	Yield bu/a 2014	Yield bu/a 2 yr**	TW lb/bu 2014	Protein* % 2014	Protein* % 2 yr**
YELLOW COTYLEDON TYPE					
DS	50.1	40.9	65.1	27.7	46.4
Agassiz	51.8	51.8	65.0	27.8	46.4
CDC	66.2	-	65.6	27.8	-
Mystique	44.4	-	64.0	29.7	-
GREEN COTYLEDON TYPE					
CDC	55.4	55.4	63.8	27.8	45.8
Majoret	44.3	44.3	64.8	28.6	46.7
Cruiser	41.0	41.0	63.5	29.0	46.2
K2	56.6	-	64.6	28.0	-
LSD 10%	11.60	--	1.20	1.2	--

Planted: May 23 **Harvested:** August 28
Previous Crop: Durum
*Protein adjusted to 0% moisture
2yr** = Average of 2012 & 2014

Dryland Notill Field Pea
Beach, ND

Cultivar	Yield bu/a 2014	Yield bu/a 2 yr	TW lb/bu 2014	Protein* % 2014	Protein* % 2 yr
YELLOW COTYLEDON TYPE					
Agassiz	33.5	47.7	64.7	24.1	23.0
CDC	26.4	41	65.0	24.0	22.35
DS	34.0	37.7	65.5	24.3	22.3
Mystique	26.0	--	63.4	26.1	--
GREEN COTYLEDON TYPE					
CDC	28.2	38.1	65.1	24.2	22.6
Cruiser	19.8	35.8	63.6	25.8	23.9
Majoret	27.3	33.6	64.7	27.6	25.2
K2	23.9	--	64.4	23.3	--
LSD 10%	6.12	--	1.02	0.98	--

Planted: May 22 **Harvested:** August 14
Previous Crop: Peas
*Protein adjusted to 0% moisture

Dryland Notill Field Pea
Arnegard, ND

Cultivar	Yield bu/a 2014	Yield bu/a 2 yr**	TW lb/bu 2014	Protein* % 2014	Protein* % 2 yr**
YELLOW COTYLEDON TYPE					
DS	53.6	41.7	64.0	27.5	27.2
Agassiz	34.1	33.5	63.7	27.8	28.1
CDC	48.2	--	64.1	27.0	--
Mystique	43.0	--	63.3	28.6	--
GREEN COTYLEDON TYPE					
CDC	40.2	37.9	63.6	28.1	27.6
Majoret	42.2	35.4	63.3	29.6	28.8
Cruiser	39.7	34.2	62.7	28.2	27.8
K2	41.4	--	64.3	27.1	--
LSD 10%	7.38	--	0.62	1.08	--

Planted: May 14 **Harvested:** August 28
Previous Crop: Barley
*Protein adjusted to 0% moisture
2yr** = Average of 2012 & 2014

Dryland Notill Chickpea
Williston, ND

Cultivar	Yield lb/a 2014	Yield lb/a 3 yr	TW lb/bu 2014
LARGE KABULI			
CDC	2303	1799	61.8
CDC Luna	1761	1511	61.3
Sawyer	1756	1459	61.5
Sierra	1385	1163	59.6
Dylan	1245	1066	58.3
CDC Alma	1807	--	62.1
CDC Orion	1804	--	60.5
SMALL KABULI			
B-90	1869	1706	62.0
DESI			
CDC Anna	1990	1566	60.3
LSD 10%	347.3	--	0.9

Planted: May 5 **Harvested:** September 3
Previous Crop: Durum

Chickpea Dryland Variety Trial[1]

Seed of four varieties of chickpeas were planted at two locations. The plots were monitored for disease every week. A small amount of Ascochyta was identified in Williston on Dwelley, Sawyer and Orion. No disease was found in Sidney. The plants in Sidney were small because of low precipitation in June and July. In Williston, Stemphylium infected all the varieties late in the season and it is unknown if the yields were affected. No fungicide treatments were applied at either site.

	Williston	Williston	Sidney	Sidney
	Test Weight	Yield	Test Weight	Yield
Variety	lb/bu	lb/bu	lb/bu	lb/bu
Dwelley	58.5	395	60.3	153
Sawyer	58	463	61.4	227
Frontier	58.9	781	61.3	241
Orion	53.1	321	61.4	334
Mean	57.1	490	61.1	239
C.V.%	1.9	22	1.3	14.2
LSD 5%	1.4	139.6	1.2	54.1
Planted	23-May		22-May	
Harvested	16-Oct		18-Aug	

[1] Collaborators Hans Schneider and Sherry Turner MSU Eastern Agricultural Research Center

WREC Chickpea Field

Sprinkler Irrigated Coded Sugarbeet Variety Trial
Sidney, MT
Approved varieties for 2015

	Root yield T/a		Sucrose %		Sucrose yield lb/a		Extractable sucrose lb/a	
Cultivar	2014	3 yr	2014	3 yr	2014	3 yr	2014	3 yr
Crystal RR269NT	42.2	33.3	17.67	16.02	14890	11076	14050	10388
Crystal RR081	41.0	31.7	18.09	16.55	14810	10914	14070	10301
BTS 42RR8N	38.4	30.6	18.80	16.80	14450	10752	13770	10160
Crystal RR052	40.7	32.0	17.94	16.01	14620	10742	13860	10062
BTS 49RR1N	40.4	31.2	17.74	16.23	14320	10569	13500	9946
SV36242NRR	39.3	30.9	17.40	15.84	13670	10238	12860	9605
BTS 42RR65	35.7	27.3	18.37	16.69	13100	9489	12400	8975
BTS 437N	42.1	--	17.80	--	14990	--	14170	--
Crystal S360NT	39.3	--	18.26	--	14360	--	13580	--
SVRR431N	37.1	--	17.69	--	13110	--	12360	--
LSD 5%	2.8		0.48		985		939	

Planted: Apr 25 **Thinned:** Jun 9 **Harvested:** Sep 24 **Previous Crop:** Small Grains

Flood Irrigated Coded Sugarbeet Variety Trial
East Fairview, ND
Approved varieties for 2015

	Root yield T/a		Sucrose %		Sucrose yield lb/a		Extractable sucrose lb/a	
Cultivar	2014	3 yr	2014	3 yr	2014	3 yr	2014	3 yr
Crystal RR269NT	37.8	32.8	17.98	17.14	13570	11307	12970	10731
Crystal RR052	36.0	30.5	17.52	16.89	12590	10383	12030	9813
Crystal RR081	37.6	31.3	17.86	17.08	13440	10808	12880	10250
BTS 49RR1N	36.1	31.9	18.05	17.21	13000	11055	12490	10534
SV36242NRR	32.5	30.4	17.66	17.10	11450	10422	10900	9924
BTS 42RR8N	33.9	31.8	18.66	17.73	12680	11329	12140	10777
BTS 42RR65	33.9	28.9	18.17	17.62	12310	10207	11740	9730
BTS 437N	36.1	--	17.83	--	12880	--	12350	--
Crystal S360NT	37.8	--	18.52	--	14000	--	13410	--
SVRR431N	32.2	--	17.22	--	11090	--	10540	--
LSD 5%	4.7		0.38		1592		1504	

Planted: Apr 23-24 **Thinned:** Jun 11 **Harvested:** Sep 29 **Previous Crop:** Small Grains

Flood Irrigated Fusarium Screen
Approved sugarbeet varieties for 2015

	Fusarium Disease rating[1]			
	Hurley site	Finsaas site	2014 Ave	3 yr Ave
Crystal RR269NT	1.88	2.00	1.94	2.19
Crystal RR052	2.00	2.25	2.13	2.56
Crystal RR081	2.00	2.75	2.38	2.92
BTS 49RR1N	2.25	2.63	2.44	2.20
SV36242NRR	2.25	2.25	2.25	2.78
BTS 42RR8N	2.13	3.00	2.57	2.18
BTS 42RR65	3.25	2.88	3.07	2.89
BTS 437N	2.88	2.63	2.76	--
Crystal S360NT	2.13	2.88	2.51	--
SVRR431N	2.00	3.00	2.50	--
LSD 5%	1.1	0.9		
Planted	Apr 24	Apr 24		
Disease rating	Aug 14	Aug 14		
Previous crop	small grain	small grain		

[1]Scale of 1-9 where 1 is a full stand of symptomless plants and 9 is totally dead.

Flood Irrigated Sugarbeet Seed Treatment Study

Sidney, MT[1]

Seed of the sugarbeet variety BTS39RR8N were treated with several different seed treatments in the plant pathology lab in Bozeman. Plots were planted on May 22 with a seed spacing of three inches, or 72,600 seed/ac. Seedling stands were counted on June 16. Roundup PowerMAX and Quest were applied on May 24 and June 12. The plots were flood irrigated on July 9, July 29 and August 14. Headline was sprayed on August 8 and Proline on August 28. Stands were counted and plots harvested on September 26. The previous crop was sugarbeet.

Table 1. Seedling and harvest stands, percent sucrose and yields of sugarbeets with different seed treatments.

Treatments/Products	Seedling stand, plants/a	Harvest stand, plants/acre	Percent sucrose	Root yld, T/a	Sucrose yld, lb/a
Thiram, Apron, Tach 20, Poncho	47553	32815	19.6	27.7	10858
Allegiance, Tach 20, Poncho, Kabina 14	54232	33759	19.3	26.5	10229
Allegiance, Tach 20, Poncho, Systiva 2.5	50312	35356	19.4	25.0	9700
Allegiance, Tach 20, Poncho, Systiva 5	48061	31944	18.6	24.6	9151
Allegiance, Tach 20, Poncho, Stamina 15, Systiva 5	41963	27951	19.9	22.9	9114
Thiram, Apron, Tach 20, Poncho, Kabina 10	52635	30710	18.7	24.0	8976
Thiram, Apron, Tach 20, Poncho, Metlock, Rhizolex	47335	29766	17.9	25.0	8950
Thiram, Apron, Tach 20, Poncho, Kabina 14	49731	31363	19.2	23.1	8870
Allegiance, Tach 20, Poncho, Stamina 15	46101	30710	17.8	24.5	8722
Allegiance, Tach 20, Poncho, Stamina 15, Systiva 2.5	48860	26717	18.2	22.9	8336
Allegiance, Tach 20, Poncho, Metlock, Rizolex	52490	26717	17.5	22.4	7840
Thiram	38841	24466	17.4	22.2	7726
Thiram, Apron, Tach 20, Poncho, Vibrance	51328	24176	17.5	20.8	7280
Allegiance, Tach 20, Poncho	45956	24103	17.5	18.4	6440
LSD 0.05	7762	9419	1.93	6.8	2882

[1] Barry Jacobsen, MSU – Bozeman, Hans Schneider and Sherry Turner, MSU Eastern Agricultural Research Center

New Sugarbeet Plot Digger

EARC

Sugarbeet Population and Nitrogen Management Study

Sidney, MT[1]

Population and nitrogen management are tools that can improve sucrose content. While nitrogen management of sugarbeets is one of the most studied aspects of sugarbeet production, there is little, if any, literature about nitrogen management of Roundup Ready sugarbeets. The objective of this study was to evaluate the response of Roundup Ready sugarbeets to varying rates of nitrogen and varying populations.

Nitrogen was applied at rates of 100 lb/ac and 130 lb/ac in the fall of 2013.The variety ACH RR052 was planted in 2-inch, 3-inch, 4-inch, 5-inch, and 6-inch seed spacings on 24-inch rows on April 25. The numbers of seedlings per plot were counted on June 5. Nitrogen was top-dressed on some of the plots through the sprinkler irrigation system at a rate of 30 lb/ac on June 28. Roundup, PowerMax and Quest were applied on May 24 and June 12. Headline was applied on August 2, and Proline was applied on August 21. Harvest stands were counted and plots harvested on September 23.

Different rates of fall applied nitrogen had little effect on yield or sucrose. The highest seeding rates resulted in significantly greater percent sucrose. There were no differences in yield among the 3- inch, 4-inch, 5-inch and 6-inch seed spacings, while the 2-inch spacing resulted in significantly lower yield. Top-dressed N resulted in lower harvest stand, lower sucrose, and lower yield.

Stands, yield and sucrose of sugarbeets planted at several seeding rates with or without top-dressed N.

Seed spacing	Applied N, Fall, lb/a	Top Dressed N, lb/a	Seedling Stand, Plants/a	Harvest Stand, Plants/a	Percent Sucrose	Root Yield, T/a	Sucrose Yield, lb/a	Extractable Sucrose, lb/a
6 inch			34470	29610	16.31	38.8	12550	11630
5 inch			39870	34640	16.22	40.2	13010	12040
4 inch			53210	40870	16.49	38.8	12720	11830
3 inch			61950	45100	16.85	38.4	12900	12030
2 inch			92910	54750	16.84	34.7	11650	10890
LSD 0.05			2114	2384	0.32	2.1	685	641
	100		56600	40330	16.63	37.8	12500	11650
	130		56370	41660	16.45	38.5	12630	11720
	LSD 0.05		NS	NS	NS	NS	NS	NS
		0	56740	42510	16.70	39.1	13010	12110
		30	56230	39480	16.38	37.2	12120	11260
		LSD 0.05	NS	1508	0.20	1.3	433	406

[1] Joyce Eckhoff, MSU Eastern Agricultural Research Center

EARC Sugarbeet Phosphorus Study
Sidney, MT
Bart Stevens, USDA/ARS NPARL

Objective: Evaluate the effect of liquid and dry P fertilizer formulations with and without a P availability enhancer (Avail) on early season growth and harvest yield components of sugarbeet and to determine optimum P rate for each combination.

Materials & Methods: This study was conducted at the MSU Eastern Agricultural Research Extension Center to evaluate the effect of liquid and dry P fertilizer formulations with and without a P availability enhancer (Avail) on early season growth and harvest yield components of sugarbeet. Dry monoammonium phosphate fertilizer (analysis: 11-52-0) was broadcast in the spring on tilled plots at 0, 30, 60, 120 and 180 lb P_2O_5/acre. Broadcast fertilizer was applied to individual plots and incorporated by tillage prior to bedding. Liquid ammonium polyphosphate fertilizer (analysis: 10-34-0; density: 11.65 lb/gal) was banded in the spring in a 2 inch x 2 inch band at the same five rates as for MAP. To one complete set of banded P treatments a low-salt liquid popup was applied at 11 lb P_2O_5/acre in the seed row at planting. Seed of a glyphosate-tolerant sugarbeet variety was planted 1.0 inch deep in 24 inch rows. Plots were irrigated using conventional furrow irrigation practices.

Plant population was determined three times during the spring beginning when seedlings were first emerging. Final population was determined at harvest. Yield (fresh root weight) and quality (root sucrose content and impurities) were determined from samples harvested September 23.

Results: Weather was generally favorable in 2014 except that planting (May 10) was delayed somewhat due to wet soil conditions. Warm weather during germination led to rapid emergence ultimately produced good stands of about 40,000 plants per acre (Table 1). Stand was the same regardless of fertilizer P source, placement or application rate. Seed row application (popup) reduced June 13 stand by 8.8% compared to the Avail-treated 10-34-0 but the differences among all P source treatments were not significant at harvest.

Table 1. Effect of fertilizer treatments on plant stand in 2014. There was no significant effect of P application rate so values in the table represent the average of all rates.

Fertilizer Treatment	Placement	May 22[1]	May 30	Jun 13	Sep 23
			---------- Plants per acre ----------		
Dry 11-52-0	Broadcast	26169 a	39851 a	40025 a	39894 a
Dry 11-52-0 + Avail	Broadcast	26109 ab	37080 b	37380 b	40983 a
Liquid 10-34-0	Banded	24257 ab	38142 ab	38496 ab	40184 a
Liquid 10-34-0 + Avail	Banded	23359 ab	37080 b	37516 b	37316 a
Liquid 10-34-0 + Avail + popup	Banded	23005 b	34467 c	34222 c	37716 a

[1]Sugarbeet plants not all emerged on May 22

Root yield and adjusted sucrose yield responded significantly to increasing P application rates but quality (sucrose and SLM) was not affected (Table 2). The response to P application rate was probably not great enough to justify applying P at rates greater than needed to maintain current soil test P levels.

Table 2. Effect of fertilizer P application rate on sugarbeet yield components. Values in the table represent the average of fertilizer source and Avail treatments. The popup treatment was not included in the calculation of means. An '*' within a column indicated that the rate effect was statistically significant while 'ns' shows that there was no effect of P rate.

P Rate lb/a	Sucrose %	SLM	Root Yield T/A	Sucrose Yield lb/a
0	18.99	0.765	30.8	11223
30	19.00	0.771	32.1	11687
60	19.06	0.736	32.3	11851
120	19.07	0.786	33.9	12427
180	19.03	0.789	34.4	12553
	ns	ns	*	*

All P source/placement combinations resulted in similar yields and quality (Tables 3, 4, and 5). This is probably due to the excellent growing conditions in 2014 which resulted in vigorous, healthy sugarbeet plants that were able to rapidly produce an extensive root system able to easily access residual soil P as well as applied fertilizer P thus ensuring that P availability was not limiting plant growth and yield potential.

Table 3. Effect of seed-placed popup fertilizer on sugarbeet yield components. Values in the table represent the average of fertilizer application rates. Both treatments in the table include Avail. The 0 P application rate was included in the calculation of means.

Fertilizer	Starter	Sucrose %	SLM	Root Yield T/A	Sucrose Yield lb/a
10-34-0	no popup	18.89 a	0.792 a	33.2 a	12011 a
10-34-0	popup	18.85 a	0.791 a	32.9 a	11849 a

Table 4. Effect of fertilizer product on early sugarbeet yield components. Values in the table represent the average of fertilizer application rates and Avail treatments. Popup treatment and 0 P application rate were not included in the calculation of means.

Fertilizer	Placement	Sucrose %	SLM	Root Yield T/A	Sucrose Yield lb/A
11-52-0	Broadcast	19.12 a	0.722 b	31.1 a	11339 a
10-34-0	Banded	18.98 a	0.764 a	32.7 a	12278 a

Table 5. Effect of fertilizer product on early sugarbeet yield components. Values in the table represent the average of fertilizer application rates and Avail treatments. Popup treatment was not included in the calculation of means.

Fertilizer	Placement	Sucrose %	SLM	Root Yield T/A	Sucrose Yield lb/a
No Avail	Broadcast	19.18 a	0.732 a	32.0 a	11631 a
Avail	Broadcast	19.05 a	0.711 a	30.2 a	11046 a
No Avail	Banded	19.05 a	0.746 a	35.4 a	12883 a
Avail	Banded	18.90 a	0.781 a	31.9 a	11673 a

2014 Integrated Sugarbeet Rhizoctonia Fungicide Trial

Barry J. Jacobsen, Ken Kephart, Joyce Eckhoff, Sherry Turner, Ghazal Ebadzadsahrai, and Johannes Schneider

This study was initiated to examine integrated control using new fungicide seed treatments, infurrow fungicides and post emergence fungicides alone or together for control of Rhizoctonia crown and root. Prior work has shown the infurrow applications of Quadris or Priaxor or use of Kabinia seed treatment plus post emergence Quadris provided the best control and allowed growers to apply the post emergence treatments at any time from the 4-6 leaf until the 10-12 leaf stage. Post emergence treatments if properly timed have worked alone based on soil temperatures at the 4" depth but in many situations growers have had only a 3-5 day window to effectively apply the post emergent fungicide.

EARC: Planted : 5/22/2014 (cone Planter) Harvested 9/25/14

SARC: Planted 5/1/2014 (Milton planter) Harvested: 9/17-18/2014

Plot design split plot: Pre-emergence treatments as whole plots and post emergence treatments as split plots- six replicates

All seed treated with 60 gm/unit Poncho and 8 gm /unit Beta +Thiram 42S @5.75 gm/unit, Apron XL @0.48 gm/unit and Tachigaren @20 gm/unit.

Plots inoculated with 39lb/A Rhizoctonia solani AG2-2 IIIB before planting. Non-inoculated plots were covered with plastic prior to applying Rhizoctonia inoculum.

Conclusions: See Table. Disease severity was lower at Sidney than at Huntley. Seed treatments alone did not provide control. At Sidney, only Quadris applied infurrow provided control whereas at Huntley, Quadris and Priaxor applied in-furrow at planting provided significant control. At Sidney the best control was achieved by combinations of Quadris applied infurrow followed by Priaxor or Quadris applied in 7" band at the 10-12 leaf stage. At Huntley Priaxor and Quadris applied at the 10-12 leaf stage provide control when applied alone post emergence fungicides alone were effective. Combinations of Kabina and Vibrance seed treatments with Quadris and Kabina 14 gm with Priaxor provided good control at Huntley.

Data from Sidney are quite different from Huntley and from data from prior years. This may be due to difference in planting time and environmental conditions. Both sites were furrow irrigated. Data at Huntley was similar to past years research with premergence treatments being significant for disease index, storable beets, and extractable sugar per acre. Post emergence treatments were also significant for disease index, storable beets/A and extractable sugar per acre. Interaction between pre and post emergence treats were not significant for these factors.

Pre -emergence treatment	Post emergence treatment	Sidney-EARC			Huntley-SARC		
		Disease index 0-100[1]	% storable[2]	Extractable Sucrose Lb/A	Disease index	% storable	Extractable Sucrose Lb/A
Un-inoculated	none	36.8 d	95.8 ab	12213 a	28.0 a	73.2 a	9802 a
Inoculated	none	54.6 abc	74.1 de	11594 ab	83.7 d	17.0 d	2859 d
Kabina 10 gm	none				70.8 bcd	29.1 bcd	4529 cd
Kabina 14 gm	none	63.6 a	69.0 ef	9631 b	81.0 d	17.6 d	3246 d
Metlock-Rizolex	none				73.7 cd	26.2 cd	3813 cd
Vibrance	none	61.9 ab	65.7 f	11324 ab	80.6 d	21.2 d	3044 d
Quadris IF	none	44.0 cd	84.7 a-e	12772 a	55.1 bc	45.1bc	6491 bc
Priaxor IF	none	46.7 bcd	76.7 de	11948 ab	50.4 b	49.1 b	7468 ab
Vertisan IF	none	49.2 a-d	75.8 de	11548 ab	65.5 bcd	34.7 bcd	5039 bcd
Un-inoculated	Quadris @ 65 F	25.9 b	94.3 ab	12679 a	20.8 a	80.2 a	10757 a
Inoculated	Quadris @ 65 F	43.1 a	81.3 a-f	11805 ab	73.1 b	27.4 bc	4618 bc
Kabina 10 gm	Quadris @ 65 F				74.9 b	25.6 c	3987 c
Kabina 14 gm	Quadris @ 65 F	46.2 a	78.5 c-f	11418 ab	64.5 b	37.2 bc	6002 bc
Metlock-Rizolex	Quadris @ 65 F				63.4 b	35.0 bc	6121 bc
Vibrance	Quadris @ 65 F	50.5 a	78.3 c-f	10226 b	57.1 b	41.8 bc	6577 bc
Quadris IF	Quadris @ 65 F	37.0 ab	82.8 a-e	11958 ab	61.6 b	36.5 bc	7507 b
Priaxor IF	Quadris @ 65 F	42.3 a	86.0 a-d	11365 ab	53.4 b	49.0 b	7132 b
Vertisan IF	Quadris @ 65 F	42.1 a	86.0 a-d	12676 a	61.0 b	39.7 bc	6291 bc
Un-inoculated	Quadris 10-12 lf	37.9 c	97.7 a	12907 ab	10.2 a	91.5 a	11270 a
Inoculated	Quadris 10-12 lf	64.4 a	69.0 ef	10217 c	50.0 bc	53.1 bc	6690 c
Kabina 10 gm	Quadris 10-12 lf				47.4 bc	53.7 bc	7079 bc
Kabina 14 gm	Quadris 10-12 lf	50.8 abc	83.8 a-e	12158 abc	65.5 c	31.2 c	5722 c
Metlock-Rizolex	Quadris 10-12 lf				65.2 c	37.3 c	6369 c
Vibrance	Quadris 10-12 lf	57.4 ab	77.5 def	11069 bc	52.7 bc	51.6 bc	6996 bc
Quadris IF	Quadris 10-12 lf	38.6 c	87.8 a-d	13122 ab	59.7 c	38.8 c	6519 c
Priaxor IF	Quadris 10-12 lf	45.2 bc	81.0 b-f	12569 abc	35.7 b	66.4 b	9738 ab
Vertisan IF	Quadris 10-12 lf	49.0 abc	80.8 b-f	13534 a	48.6 bc	51.7 bc	7694 bc
Un-inoculated	Priaxor 10-12 lf	40.2 ab	97.0 ab	11291 ab	9.5 a	92.0 a	11364 a
Inoculated	Priaxor 10-12 lf	49.0 ab	77.5 def	10669 ab	41.9 b	61.4 b	8813 ab
Kabina 10 gm	Priaxor 10-12 lf				60.3 bcd	41.9 bc	5755 cde
Kabina 14 gm	Priaxor 10-12 lf	52.8 a	74.8 de	9800 b	51.8 bc	47.3 bc	7723 bcd
Metlock-Rizolex	Priaxor 10-12 lf				74.1 d	27.8 c	4561 e
Vibrance	Priaxor 10-12 lf	49.2 ab	74.5 de	11584 ab	73.1 cd	28.1 c	4970 de
Quadris IF	Priaxor 10-12 lf	35.0 b	90.7 a-d	12667 a	54.7 bcd	45.9 bc	7032 bcd
Priaxor IF	Priaxor 10-12 lf	39.5 ab	86.0 a-d	11573 ab	39.9 b	60.7 b	9606 ab
Vertisan IF	Priaxor 10-12 lf	41.9 ab	88.7 a-d	12827 a	45.4 b	57.0 b	8043 bc

1) Disease index calculated on Rupple scale of 0 (no disease)-7 (completely rotted roots) and the value 0 = no disease and 100 completely rotted roots

2) % storable is the % roots on the Rupple 0-3 ratings. Beets with 3 or less ratings will store well based on USDA/ ARS Fargo research

Study of the Role of Microbial Life in Soil Suppressiveness to Rhzoctonia Solani

Ghazal Ebadzad

Soil is the most valuable possession on our farms. A healthy soil produces healthy crops. Soil health has been defined as: “the continued capacity of the soil to function as a vital living system”. Healthy soil harbors a large number of organisms that help to control plant disease, insects and weeds and provides a range of important services that promote plant growth and vigor. In the eyes of a plant pathologist the term “soil health” would be studied in relation to its ability to suppress plant disease and elevate agricultural productivity with particular reference to sugarbeet cultivation as an important crop in NE Montana which in recent years has showed a significant decrease in sugar content and thus sugar yield due to the effect of disease and pests. A soil is considered suppressive when disease incidence or severity remains low even though the pathogen is introduced in the presence of a susceptible host.

Rhizoctonia solani causes damping-off, black root rot and crown rot in sugarbeet. Based on experiences of growers and field experiments, *Rhizoctonia* suppressive soils can occur in sugarbeet. Soil suppressiveness can be evaluated with a bioassay. It is essential to use an integrated approach to explore key groups of microbial communities involved in *Rhizoctonia* suppression.

Hence, an experiment will be conducted in the laboratory and the greenhouse to determine the occurrence of disease-suppressive soil in MT and decipher the rhizosphere microbiome and the mechanism by which they protect plants against root diseases.

Candidate soil samples were collected from safflower and sugarbeet fields located in Sidney and two sugarbeet fields in Huntley. Half of each of the experimental soil was autoclaved at 121 ºC to destroy microbial life. Autoclaved and non-autoclaved potting soils will be artificially infested with *R. solani* anastomosis group 2-2IIB and sugarbeet seeds will be directly sown. A preliminary experiment is currently underway to elucidate the optimum density of *R. solani* inoculum for infesting of sugarbeet seedlings.

The tested soils with different levels of suppressiveness will be analyzed using denaturing gradient gel electrophoresis (DGGE) method to identify antagonistic microorganisms involved in soil suppressiveness. Total genomic DNA will be extracted from the soil samples. Amplification of 16S and 18S rDNA will be carried out with generic bacterial and fungal primers and bands of interest will be excised from denaturing gel and sequenced.

These findings can help to develop an eco-friendly control strategy of *Rhizoctonia* root rot in sugarbeet and increase yield and sucrose of sugarbeet in NE Montana.

Crop Performance Comparisons on Dryland – Williston, ND

Chet Hill [1]

Crop	Variety	2014 Selling Price $/bu	3 Yr Ave Yield bu/a	Gross Return $/a	$ Gr. Ret/a + or - Steele-ND
HRS Wheat	Velva	5.84	39.7	$232	+$28
	Barlow	5.84	35.0	$204	$0
HRW Wheat	Jerry	5.29	58.2	$309	+$105
Durum Wheat	Joppa	10.00	41.9	$419	+$215
Barley (feed)	Conlon	2.25	71.4	$161	-$43
(malting)	Innovation	4.25	71.3	$303	+$99
Oats	Otana	3.35	91.5	$306	+$102
Corn (grain)	Average*	2.85	76.5	$218	+$14
Flax (brown)	Neche	11.50	19.7	$226	+$22
(yellow – food)	Carter	12.50	19.2	$240	+$36
Soybeans	Sheyenne	9.75	27.0	$263	+$59
Field Peas (green)	Arcadia	8.50	41.7	$354	+$150
(yellow)	DS Admiral	6.75	41.6	$281	+$76
		$/CWT	lbs/ac		
Brown Mustard	Average*	25.50	1046	$267	+$63
Yellow Mustard	Tilney	30.00	1102	$331	+$127
Canola	HyClass 955	16.75	1359	$228	+$24
Safflower	Average*	24.00	1707	$409	+$205
Sunflower (oil)	Average*	17.15	1688	$289	+$85
Buckwheat	Manor	24.00	1249	$299	+$95
Lentils (sm. green)	Essey	29.00	1541	$447	+$243
(med. green)	CDC Richlea	27.00	1411	$381	+$177
(lg. green)	Pennell	35.00	1370	$479	+$275
(red)	CDC Rider	29.00	1465	$424	+$220
Chickpeas (desi)	CDC Anna	16.00	1566	$251	+$47
(kabuli)	CDC Frontier	26.00	1799	$467	+$263
(small kabuli)	B-90	19.00	1706	$324	+$120
Pinto Beans	Maverick	24.50	650	$159	-$45
Navy Beans	Norstar	24.00	450	$108	-$96

[1]NDSU - Williston Research Extension Center *Average of several varieties within the crop

Development of Durum Varieties for the Mondak Region

Joyce Eckhoff

Development of solid-stemmed varieties has been a priority for this project for the last several years. A population with the genetics for the solid-stem character was developed and has been maintained each year at the EARC. Each year, lines with solid-stems and other desirable characteristics such as low cadmium, resistance to new strains of stem rust, and good quality are crossed onto the population. Solid-stemmed F_3 plants are selected each year. Lines are continued to the F_7 generation, selecting for solid stems, disease resistance and quality.

We tested 11 solid and semi-solid stemmed lines in advanced yield trials in 2014. Stem solidness is rated on a scale of 5-25, with 5 being completely hollow and 25 being completely solid. Two of the lines had ratings of 16 and the rest had ratings of 20 or greater. Mountrail had a stem-solidness rating of 8.5, and Alzada had a stem-solidness rating of 9.6. One solid-stemmed variety was tested in the statewide durum yield trial, and had an average stem-solidness rating of 20. Mountrail averaged 7 in the same trials.

Cadmium (Cd) is a nonessential heavy metal that may cause health problems for some people. Diet is the main source of Cd for nonsmokers, with cereal products accounting for up to 20% of the daily intake. The current official standard for maximum level of Cd in wheat grain as stated by the Codex Alimentarius Commission (a part of the World Health Organization), is 0.2 ppm. The European Union has adopted this level of Cd as the maximum allowed in domestic and imported durum, and is considering lowering the level to 0.15. Soil characters affect the amount of Cd taken up by durum. Additionally, genetics play a role in accumulation of Cd in the grain. Most durum genotypes grown in Montana accumulate Cd in the grain. A low Cd-accumulation trait exists in durum and is caused by a single dominant gene. Eleven lines with low Cd accumulation and good quality were identified. Crosses were made using high quality lines as female parents and low Cd-accumulation lines as male parents. We tested 49 low-Cd lines from these crosses in advanced yield trials this year, and 178 low-Cd lines in preliminary trials. We hope to have one or more low-Cd lines entered in the statewide trial in 2015.

Stem solidness ratings of 11 experimental lines tested under advanced yield trials at EARC in Sidney, MT

Entry	Stem Solidness Rating
MT101677	23.7
MT101678	22.8
MT101693	22.8
MT101694	21.7
MT101717	16.0
MT101718	15.6
MT101720	21.9
MT101721	23.3
MT101722	24.2
MT101727	20.3
MT101730	23.8
Mountrail	8.5
Alkabo	7.8
Grenora	10.7
Alzada	9.6

Evaluating Fertilizer Timing in Durum and Barley

Tyler Tjelde

Objectives

This project investigated the crop response to applying urea (46-0-0) granular fertilizer at different times throughout the growing season. Maximizing crop fertilizer uptake and minimizing urea loss in an irrigated system is very important environmentally as well as financially. This project was initiated as a result of grower interest to determine if supplemental applications would be more economically and environmentally beneficial than one application at planting time.

Methods

The project was designed to compare five fertilizer timing treatments with *Tradition* barley and *Divide* durum. The experimental design was a randomized complete block replicated four times. Buffer plots were planted between each treatment. Each individual treatment plot was soil sampled (0-36") prior to planting and fertilizer applications to determine available soil NO_3-N. The previous crop was soybeans. Durum and barley yield goals were 80 and 120 bushels and planting populations were 1.5 million and 1.25 million PLS per acre respectively. The trial was planted on May 15, 2014. Fertilizer was applied using a Barber granular spreader and incorporated by applying a minimum of .50 inches with overhead irrigation. All cultural practices (tillage, planting populations, chemical, irrigation, and fungicide applications) were the same for each treatment to minimize the effects of other variables. The barley plots were harvested August 21 and the durum September 3, 2014 using a small plot combine.

2014 Durum Fertilizer Timing

Treatment	Soil Test (0-36") NO_3-N (lb/A)	Fertilizer* lbs N/acre/App.	Yield bu/A	3-year Yield avg bu/A	Test Wt lb/bu	Protein %	3-year Protein avg. %
Check (no fertilizer applied)	62	0	43.3	40.0	59.0	13.7	12.6
ALL PRE	49	151	70.5	63.7	59.1	16.5	15.9
PRE/POST1	59	71	71.1	62.5	58.9	16.6	16.2
PRE/POST1/POST2	58	47	68.8	61.9	58.8	15.7	15.8
PRE/POST1/POST2/POST3	75	31	59.4	57.9	59.0	15.2	15.0
POST1/POST2/POST3	61	46	54.9	54.5	58.9	15.5	16.0
Mean			62.5	56.8	59.0	15.5	15.3
CV %			10.7	--	0.7	2.7	--
LSD (0.05)			10.1	--	ns	0.6	--

2014 Barley Fertilizer Timing

Treatment	Soil Test (0-36") NO_3-N (lb/A)	Fertilizer* lbs N/acre/App.	Yield bu/A	3-year Yield avg bu/A	Test Wt lb/bu	Protein %	3-year Protein avg. %
Check (no fertilizer applied)	57	0	83.3	63.3	49.2	11.0	11.7
ALL PRE	54	126	123.2	89.2	50.3	11.8	12.8
PRE/POST1	45	68	116.1	89.7	49.9	12.0	13.2
PRE/POST1/POST2	60	40	123.7	90.2	49.7	12.6	13.3
PRE/POST1/POST2/POST3	63	29	112.4	84.8	49.6	12.0	12.9
POST1/POST2/POST3	63	39	105.7	77.4	49.2	11.5	13.1
Mean			110.7	82.4	49.6	11.8	12.8
CV %			8.5	--	0.8	4.2	--
LSD (0.05)			14.2	--	0.6	0.8	--

*1st application (ALL PRE) - at planting

2nd application (POST1) - 5 leaf T2 stage

3rd application (POST2) - flag leaf stage

4th application (POST3) - heading stage

Conclusion

This research project (2012-2014) was designed to compare fertilizer timing treatments with *Tradition* barley and *Divide* durum. What was determined from the research is applying all of the needed Nitrogen at planting is the optimal fertilizer application treatment. The additional supplemental applications throughout the growing season did not result in yield increases or grain quality improvements.

Applying Fungicide at Early Flower in Durum

Tyler Tjelde and Shana Pederson (NCREC)

Objectives

This project investigated the response to applying fungicides at early flowering stage to four durum wheat varieties. Durum acres have steadily been declining and maintaining yield and quality has become a challenge the last few years with the abnormally wet and cool conditions. The four varieties were selected to demonstrate varietal resistance and susceptibility and assess response to fungicide application.

Methods

The project was designed to compare Headline and Prosaro fungicide to four different durum varieties at early flower stage. The four varieties selected were *Carpio*, *Divide*, *Joppa*, and *Normanno*. The experimental design was a randomized complete block replicated four times. Crop management decision were set based off an 80 bushel yield goal and a planting population of 1.5 million PLS per acre. The trial was planted on May 19. All cultural practices (tillage, planting populations, herbicide, and irrigation) were the same for each treatment to minimize the effects of other variables. Fungicide application occurred on July 10 using a ground sprayer and applying 20 gallons per acre water. Application rates were 9 oz. per acre of Headline and 8.2 oz. per acre Prosaro. The durum plots were harvested August 29 using a small plot combine.

	Carpio			*Divide*			*Joppa*			*Normanno*		
Treatment	Yield	Test Weight	Protein	Yield	Test Weight	Protein	Yield	Test Weight	Protein	Yield	Test Weight	Protein
	bu/a	lb/bu	%	bu/a	lb/bu	%	bu/a	lb/bu	%	bu/a	lb/bu	%
Untreated (no fung. applied)	65.5	61.1	16.2	70.5	60.3	17.2	69.8	61.0	16.2	45.2	53.3	16.3
Headlire	74.1	61.2	17.4	70.3	60.0	17.8	70.2	61.2	17.2	59.0	55.9	16.6
Prosaro	80.8	61.2	16.8	77.3	60.3	17.3	78.3	61.1	16.8	67.9	57.8	16.2
Headlire + Prosaro	83.6	61.3	16.6	75.5	59.9	17.2	87.3	61.7	16.1	70.4	57.1	16.4
Mean	76.0	61.2	16.7	73.6	60.1	17.4	76.4	61.3	16.6	60.6	55.0	16.4
CV %	4.5	0.7	3.3	7.5	0.7	1.8	7.7	0.6	3.2	6.7	1.7	3.8
LSD (0.05)	5.5	ns	0.9	ns	ns	0.5	9.4	0.6	0.8	6.5	1.6	ns
LSD (0.10)	4.4	ns	0.7	7.1	ns	0.4	7.6	0.5	0.7	5.2	1.3	ns

Conclusion

This project will be conducted again in 2015. Additional years of research are needed to fully assess the effects of fungicide applications at the early flowering stage in durum. As always remember that one year's data should always be used with caution. Though this seems to be very positive data going forward. This year's data shows that a fungicide can be very beneficial when applied to durum at the early flowering stage and will provide protection against Fusarium Head Blight (Scab). Looking at this data it emphasis the importance of selecting varieties that possess some resistance. To find this information on these varieties and others refer to page 11 (Durum varietal description).

Comparing Tillage Systems (conventional, minimum, no-till) With Overhead Irrigation Using a 3-Year Crop Rotation of Corn, Soybean, and Barley (Nesson Valley 2014).

Tyler Tjelde and James Staricka

Objectives

This project examines the interaction between tillage systems and soil quality and the interaction between crop production and tillage to better understand the benefits of overhead irrigation on production and tillage. Questions we hope to answer include: How is tillage going to affect the quality of our soil? Will soil quality affect crop production when irrigation is involved? What are the benefits of selecting the proper tillage to match the specific crop?

Methods

A three-year crop rotation of corn, soybean, and barley was initiated in the spring of 2008. The plots are setup in strips, 50 feet by 200 feet, and replicated four times in a split block design. Tillage of the conventional plots was initiated in the fall following harvest. In the spring, additional tillage was done to the conventional tillage plots. Conventional tillage (CT) consisted of multiple passes (6 total) with a disc, ripper, and mulcher resulting in <30 % residue left. Minimum tillage (MT) varied (≤ 2 passes) based on previous crop and was done in the spring prior to planting. Corn residue was aggressively disked (5mph) cutting at a depth of 4 inches while still maintaining >30% residue cover and mulched for firmer seed bed. Barley residue was also disked but ground speed and depth were reduced to maintain the > 30% residue cover and mulched to firm soil seedbed. A field cultivator was used to till the soil in soybean residue, leaving most of the residue on the soil surface. Only trash wipers (residue managers) were used in the No-till (NT) system to move residue from seed row. Crops were seeded with commercial field equipment and each crop was treated identically regardless of the tillage system during the growing season. Fertilizer was spring applied at recommended rates determined by soil testing. Weeds were managed with herbicides to minimize their impact on production. Percent residue cover, soil temperature in corn, and stand counts were measured after planting or crop emergence. Soil water content, shown in Figure 1, was measured weekly in all three crops and tillage systems to identify crop water needs. Representative areas within the plots were sampled with a plot combine for grain yield, protein, and test weight measurements. All crop and data analyses was done at the WREC.

No-till corn

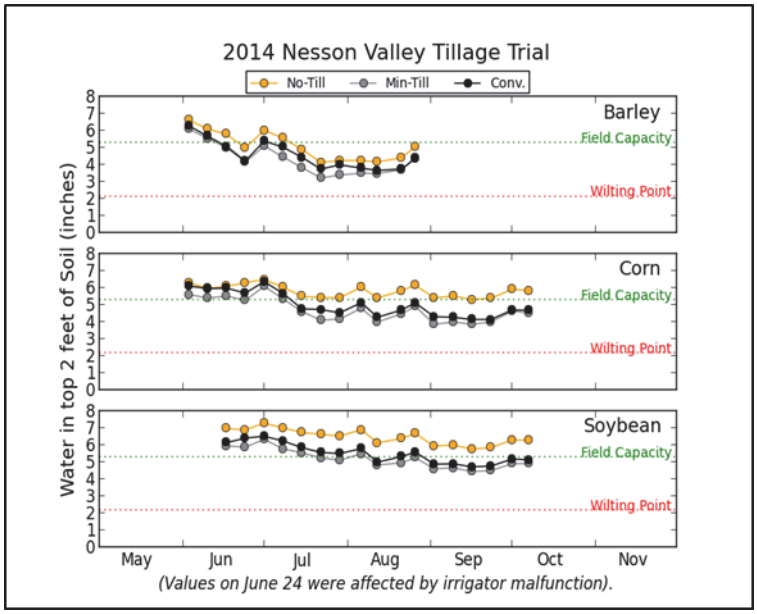


Figure 1

Results

Corn

The corn was planted May 22. The emergence date for the CT and MT was May 31 and NT was June 1. Measured stand counts were no different between treatments. Previous crop residue remaining on surface after planting was less than 10% on CT, 35% on MT and greater than 82% on NT. There were nine irrigations totaling 6.3 inches. The first irrigation was July 14 and the final irrigation was on August 15. At the start of the season, soil water (Figure 1) was similar among the treatments. As the summer progressed, soil moisture in the NT remained constant where as it decreased in CT and MT. Temperature sensors in the corn tillage plots showed soil temperature variability in tillage treatment, and in the accumulative soil growing degree days. Soil temperatures (Figure 2) were lower in NT than CT and MT during June. By the end of the growing season this resulted in the NT plots to having 162 degree day fewer heat units. A hailstorm stripped corn leaf matter causing premature plant death on September 3. At this time the crop was at full dent so harvest loses were to be expected. The first killing frost occurred September 11. This early plant death plus the delayed growth caused the NT plots to have considerably lower yield. Plots were harvested October 15 using a small plot combine and grain moistures had dried to 14 percent for all treatments. Yields (Table 1) were reduced compared to previous years. Test weights for CT, MT and NT were 53.6, 53.1, and 51.6 respectively.

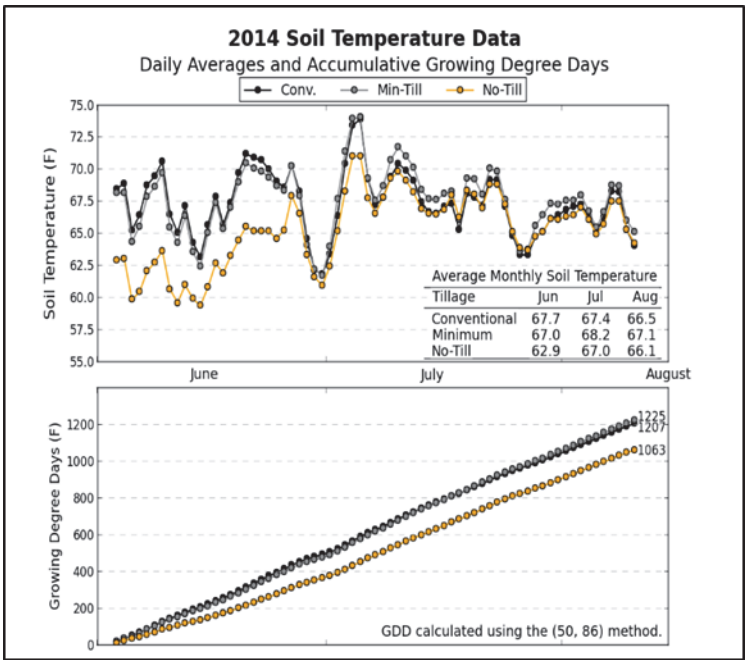
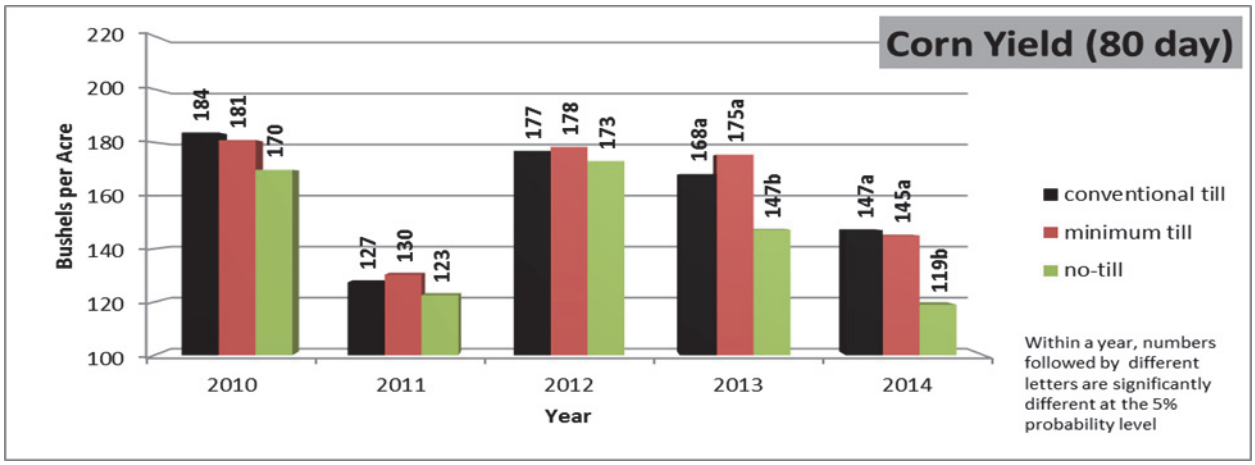


Figure 2

Table 1



Barley

The barley was planted May 12. The emergence was similar for the three treatments but stand counts were lower in the NT plots. This has been a consistent trend over the course of this study as it has been a challenge getting good seed to soil contact with the residue. Previous crop residue remaining on surface after planting was less than 8% on CT, 30% on MT and greater than 89% on NT. The residue in NT is greater because less corn residue broke down from the previous year. There were no differences in soil water content (Figure 1) throughout the summer for the three tillages. There were nine irrigations totaling 5.8 inches. The first irrigation was on June 9 and the final irrigation was on July 24. Rainfall from May 1 to September 1 was below normal (7.5 inch). The cooler growing season temperatures had a greater impact on NT plots compared to CT and MT. Plots were harvested September 3. Yields trends were similar to the previous five years. CT (Table 2) have yielded the best followed by MT and then NT which has consistently been the lowest yielding. Test weights for CT, MT and NT were 50.2, 50.5, and 48.4 respectively.

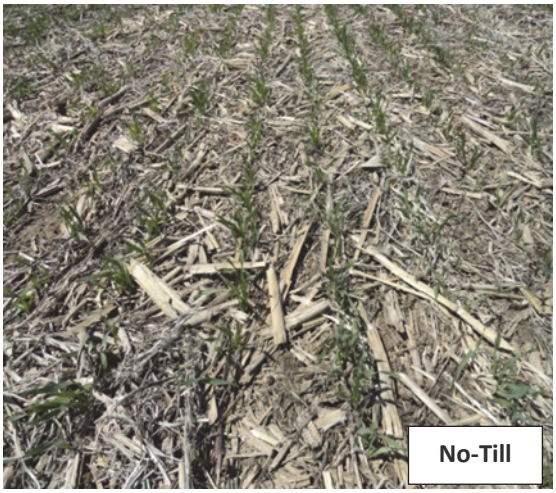
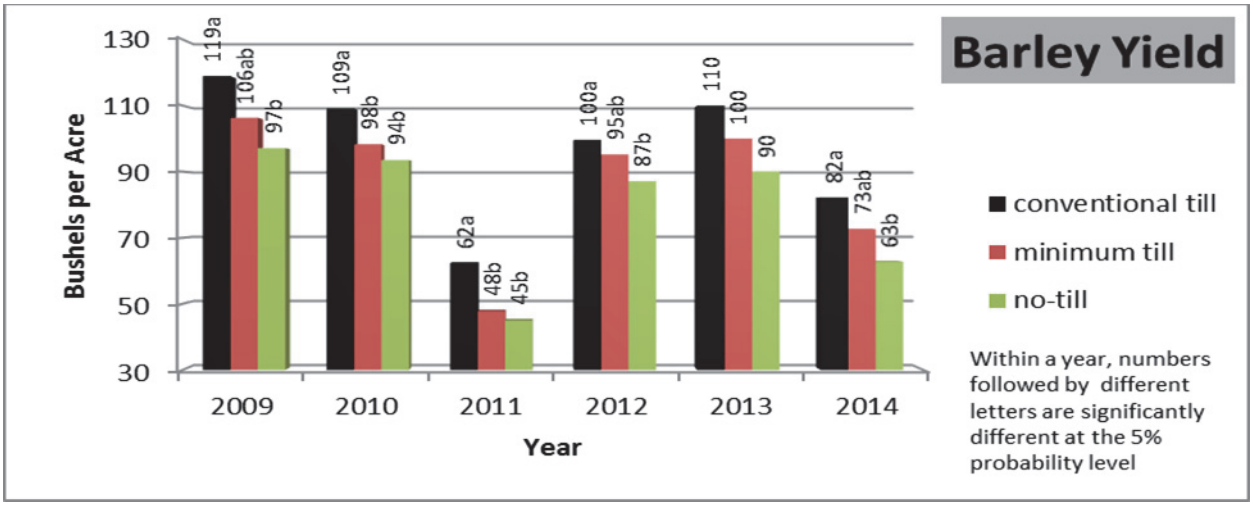


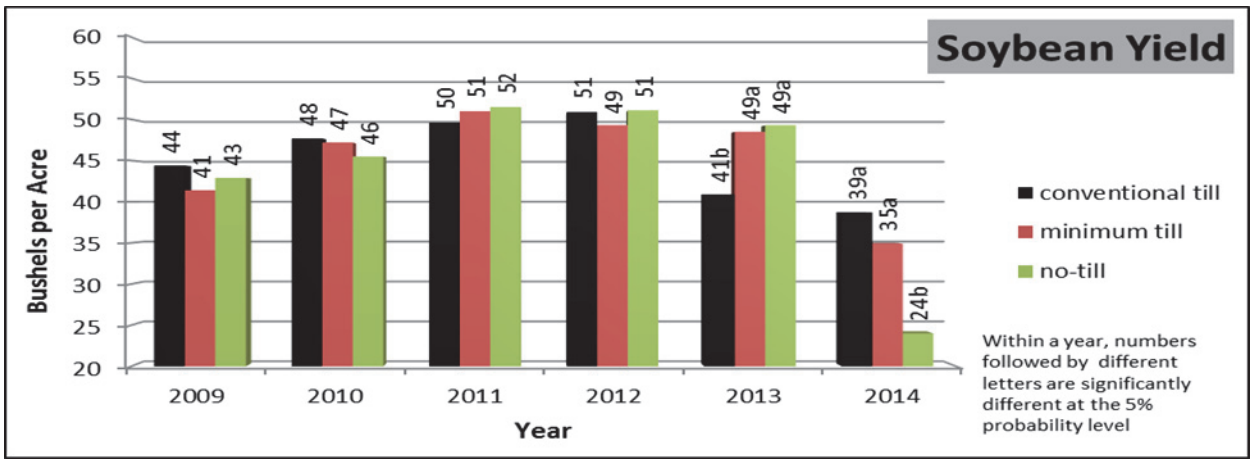
Table 2



Soybean

The soybeans were planted May 28. Emergence and stand counts were similar among the three treatments. Previous crop residue remaining on surface after planting was less than 20% on CT, 44% on MT and greater than 90% on NT. After emergence plant growth was slower in NT compared to CT and MT. A hail storm caused significant plant damage on September 3 that slowed reproductive development. This delayed plant growth impacted plant maturity and was detected at the first killing frost on September 11. All three tillage treatments were impacted by the hailstorm and early frost: CT and MT had reached late R5 early R6, and NT was at the early R5 reproductive stages. There were nine irrigations totaling 4.5 inches. The first irrigation was on July 17 and the final irrigation was on August 15. Soil water content (Figure 1) was similar to the previous years with the NT starting out wetter and maintaining this higher level throughout the growing season. Plots were harvested October 10. Soybean yields have been consistent prior to the past two years (Table 3), as Sclerotinia (white mold) disease impacted the yields of treatments in 2013 and hail damage and an early frost impacted yield this season. Test weights for CT, MT and NT were 56.3, 56.3, and 55.8 respectively.

Table 3



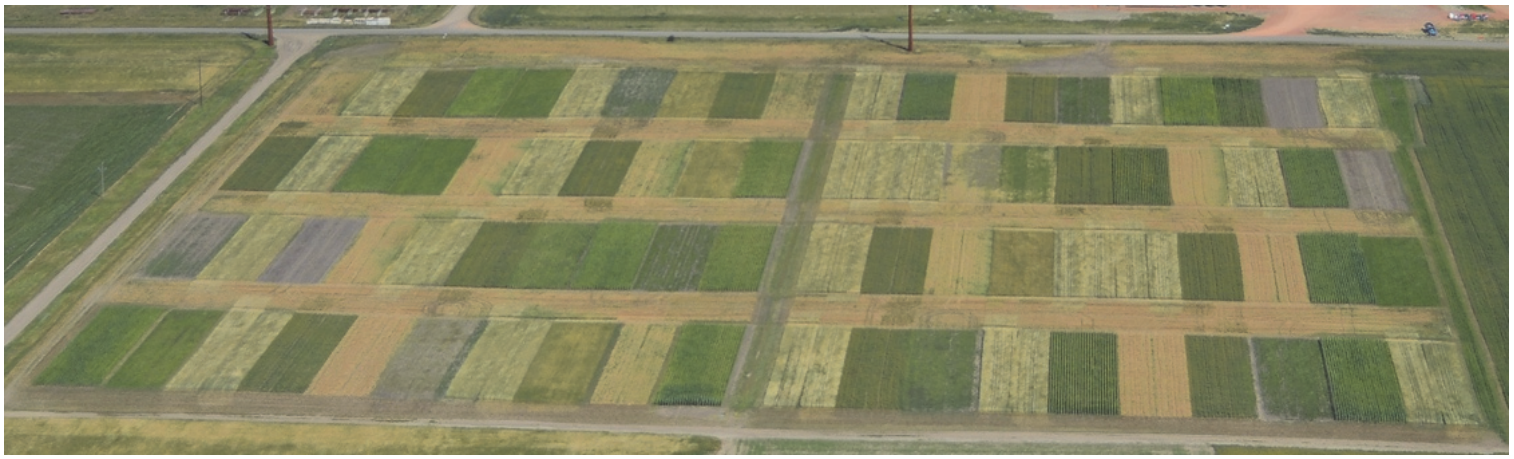
Conclusions

Comparing tillages systems with a three year rotation of corn, soybean and barley has reached its halfway point (6 of the 12 years) and MT is proving to be as effective as CT in a three year rotation under irrigation. Other observations made are the soybean NT system following corn is doing as well as the CT and MT systems. The results have demonstrated reduced tillage can be as productive in an irrigated environment as a CT system.

Sustainable Agroecosystem for Soil Health in the Northern Great Plains

(Williston Research Extension Center-2014)

Don Tanaka, Gautam Pradhan, Jim Staricka, Jerry Bergman, Chet Hill, Kyle Dragseth, Diana Amiot



In 2013, the Williston Research Extension Center initiated a new project investigating diversifying dryland crop rotations. The objectives of this project are to "Develop agricultural systems to improve soil health, crop production, precipitation use, and economic sustainability." This will be a long term research project involving multiple researchers from various disciplines. Don Tanaka, formerly USDA-ARS Scientist from Mandan and currently WREC seasonal scientist, is serving as the project coordinator of this project. Gautam Pradhan, WREC Research Agronomist is investigating agronomic and physiological aspects. Jim Staricka, WREC Soil Scientist, is investigating soil water use and physical soil quality aspects. Jerry Bergman, WREC Director, is responsible for the overall administration and is assisting in the agronomic component of the study. Chet Hill, WREC Area Extension Ag Diversification Specialist, is conducting economic analysis. Kyle Dragseth, WREC Farm Manager, is overseeing the field work, applying best management practices in the production of all crops. Diana Amiot, WREC Crop Production Research Specialist, is assisting in plot maintenance and data collection. WREC plans to recruit additional personnel with expertise in the areas of plant disease, insects, and soil microbiology to participate in the project.

Experimental Detail

Treatments:
5 Fixed Rotations and 6 "Dynamic" Rotations.
Each phase of every rotation included each year (fixed rotations).
Field Design:
Randomized Complete Block; 4 Replications.
Individual plots are 60 by 200 feet. Total area (including roadways and borders) is 40 acres.
All plots will be No-Till.

The 5 Fixed Rotations

2013	2014	2015	2016	2017
Durum	Fallow	Durum	Fallow	Durum
Durum	Durum	Durum	Durum	Durum
Durum	BP1*	Pea	Corn	Safflower
Durum	HRWW/ BP2	Pea/BP3	Corn	Safflower
…….Perennial Grass Mix with Pollinator Plants……				

* BP1 = Biological primer 1; BP2 = Biological Primer 2; BP3 = Biological Primer 3; HRWW = Hard Red Winter Wheat.

What are the Biological Primers?

Biological Primer 1 is a full season cover crop mix, seeded between June 1st and June 20th.
Biological Primer 2 is a cover crop mix seeded after winter wheat but before August 10th.
Biological Primer 3 is a cover crop mix seeded after pea.

"Dynamic" Rotations

Crops will be determined each year based on weather and market conditions and using the following tools:
The USDA-ARS Crop Sequence Calculator (An interactive program for viewing crop sequencing information and calculating returns; www.mandan.ars.usda.gov)
The NDSU Projected Crop Budgets for North West North Dakota (www.ag.ndsu.edu/publications/farm-economics-management).
The crops will include a mix of cool-season grasses, warm-season grasses, cool-season broadleaves, and warm-season broadleaves.
Each year durum will be grown in one of the rotations to serve as a comparison.

The Dynamic Rotations to Date

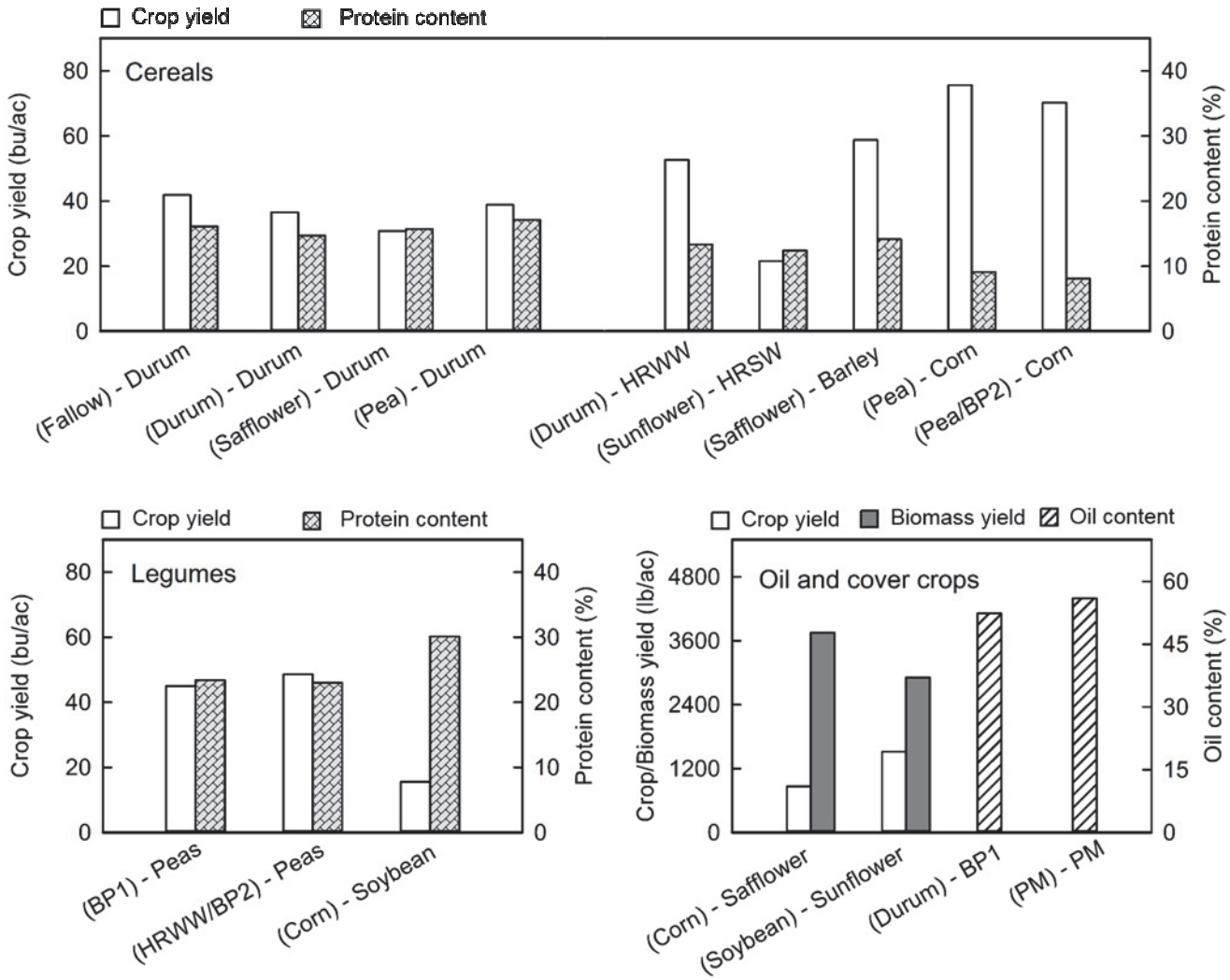
2013	2014	2015	2016	2017
Durum	HRWW	*TBD*	*TBD*	*TBD*
Corn	Soybean	*TBD*	*TBD*	*TBD*
Soybean	Sunflower	*TBD*	*TBD*	*TBD*
Safflower	Barley	*TBD*	*TBD*	*TBD*
Sunflower	HRSW	HRWW	*TBD*	*TBD*
Pea	Durum	*TBD*	*TBD*	*TBD*

TBD = To be determined; HRSW = Hard Red Spring Wheat; HRWW = Hard Red Winter Wheat.

Measurements

Crop Performance: Leaf chlorophyll, canopy temperature, grain yield, protein & oil content; grain carbon, nitrogen and phosphorus amounts; total dry matter; straw production; straw carbon, nitrogen & phosphorus amounts; crop water use.
Soil Quality: Infiltration; aggregate stability; bulk density; organic matter amount, plant-available levels of nitrogen, phosphorus, potassium and other nutrients; pH; salinity.
Pests: Diseases, insects, weeds.
Soil microbial parameters: To be determined.

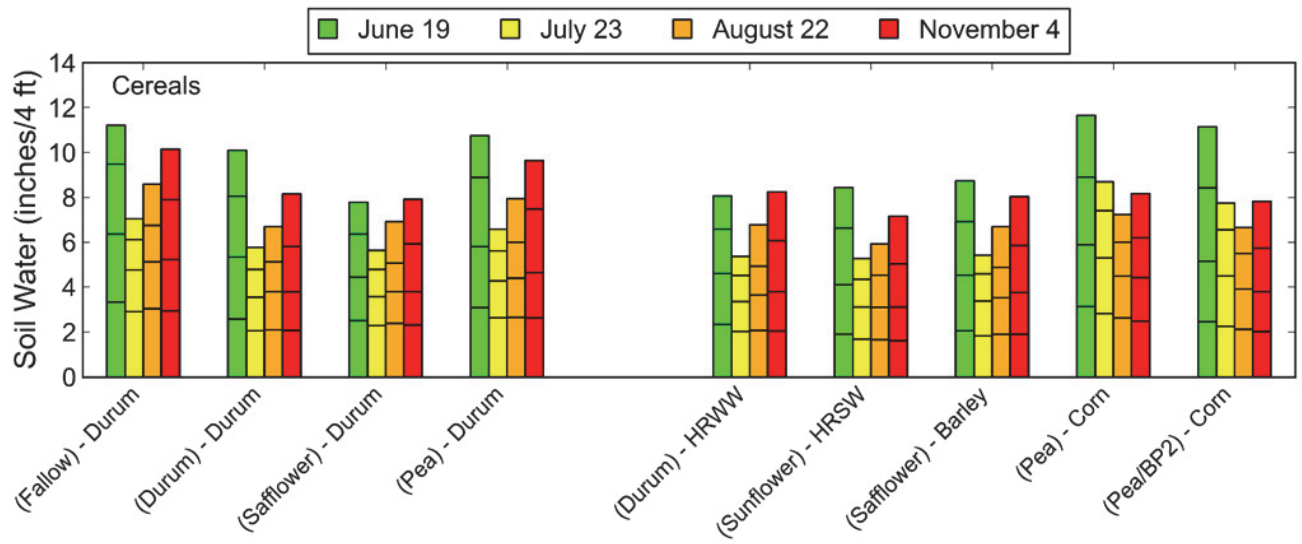
Results – 2014



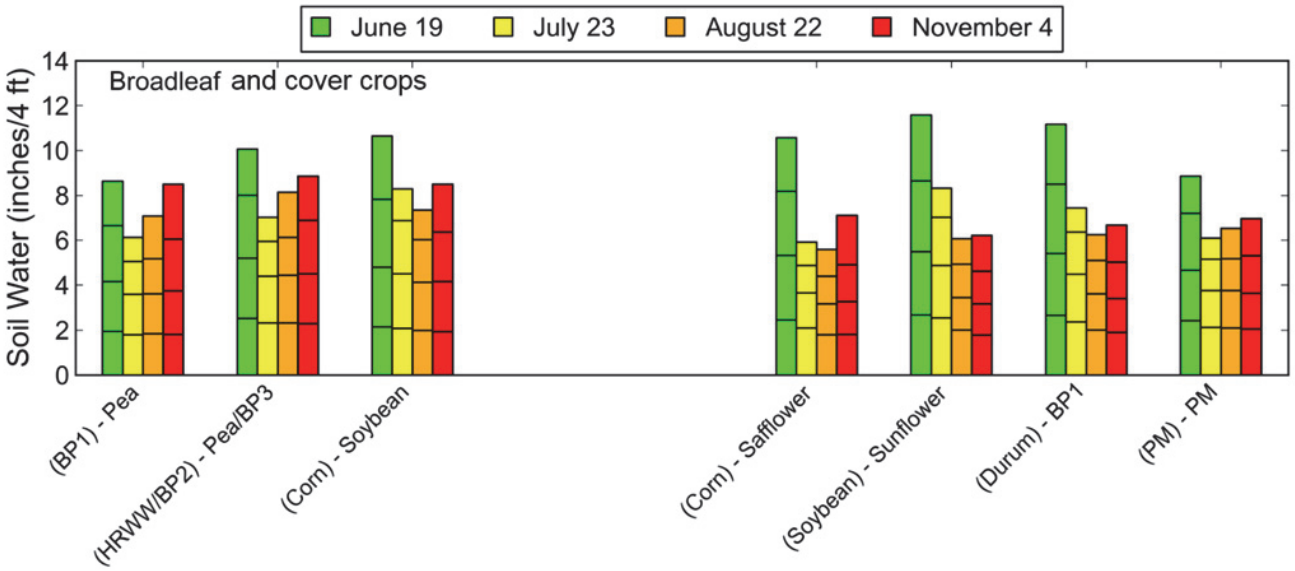
Cropping sequence

* The previous crop in 2013 are given within a bracket. BP1 = Biological Primer 1; BP2 = Biological Primer 2; BP3 = Biological Primer 3. HRWW = Hard Red Winter Wheat; HRSW = Hard Red Spring Wheat; PM = Perennial Mix. The reduced yield of late season crops (corn, soybean, safflower, and sunflower) was due to early fall frost damage; and that of hard red spring wheat was due to poor stand.

Figure 2. Soil Water Content of Different Cropping Sequences*



Cropping sequence



Cropping sequence

* The previous crop in 2013 are given within a bracket. BP1 = Biological Primer 1; BP2 = Biological Primer 2; BP3 = Biological Primer 3. HRWW = Hard Red Winter Wheat; HRSW = Hard Red Spring Wheat; PM = Perennial Mix. Each bar is divided into four sections that represent the water content in each of the 1-ft depth increments down to 4 feet.

Table 1. The Economic Returns from Different Cropping Sequences*

Cropping Sequence		Mean Yield**		Market Price	Market Revenue	Cost	Net Return
2013	2014			($/bu or lb)	($/a)	($/a)	($/a)
	Cereals						
Fallow	Durum	41.8	bu/a	10.00	418.00	162.85	255.15
Durum	Durum	36.5	bu/a	10.00	365.00	162.85	202.15
Safflower	Durum	30.8	bu/a	10.00	308.00	162.85	145.15
Pea	Durum	38.9	bu/a	10.00	389.00	162.85	226.15
Durum	HRWW/BP2	52.7	bu/a	5.29	278.78	214.21***	64.57
Sunflower	HRSW	21.5	bu/a	5.84	125.56	162.04	-36.48
Safflower	Barley	58.8	bu/a	4.25	249.90	141.34	108.56
Pea	Corn	75.6	bu/a	2.85	215.46	185.25	30.21
Pea/BP2	Corn	70.2	bu/a	2.85	200.07	185.25	14.82
	Broadleaf Crops						
BP1	Pea	45.0	bu/a	7.20	324.00	148.84	175.16
HRWW/BP2	Pea/BP3	48.6	bu/a	8.50	413.10	201.46***	211.64
Corn	Soybean	15.5	bu/a	9.75	151.42	134.78	16.64
Corn	Safflower	864.2	lb/a	0.24	207.41	152.52	54.89
Soybean	Sunflower	1516.4	lb/a	0.172	260.83	138.91	121.92

* The costs and returns were given for year 2014 and were estimated from the Projected 2014 Crop Budgets – North West North Dakota (Swenson and Haugen, 2013) and 2014 Agricultural Research Update (MSU Eastern Agricultural Research Center and NDSU Williston Research extension Center). BP1 = Biological Primer 1; BP2 = Biological Primer 2; BP3 = Biological Primer 3. HRWW = Hard Red Winter Wheat; HRSW = Hard Red Spring Wheat. ** The reduced yield of late season crops (corn, soybean, safflower, and sunflower) was due to early fall frost damage; and that of hard red spring wheat was due to poor stand. ***Costs of growing cover crops (BP2 or BP3) has been included.

Quantifying Water Use (Water Use Efficiency) in Irrigated Barley, Wheat, and Sugarbeet Production on Lihen Fine Sandy Loam Soils (Nesson Valley 2014).

James Staricka and Tyler Tjelde

Objectives

The objectives of this project are to investigate different irrigation rates in crop production to improve water use efficiency and refine irrigation scheduling recommendations.

Methods

The experimental design is a Randomized Complete Block Design (RCBD) with four replications of four treatments. Each plot was 50 ft by 60 ft.

The treatments consist of four irrigation rates (100%, 67%, 33%, 0%). The irrigation amounts for the 100% treatment were determined using the soil moisture data collected from the neutron depth moisture gauge and referencing the North Dakota Ag Weather Network (NDAWN) irrigation scheduler (http:// ndawn. ndsu.nodak.edu). The NDAWN scheduler is a checkbook system using soil properties (thickness of soil layers and the water holding capacity of each layer), weather parameters (average daily air temperature, daily solar radiation, daily rainfall), crop properties (root depth and water use based on growth stage, planting date and emergence date), and user-supplied irrigation information (dates and amounts). An observation station of the NDAWN system, listed as "Hofflund" on the NDAWN records, is located on the research site.

Soil water content of top two feet was determined within each plot using a neutron depth moisture gauge. These weekly soil moisture measurements were used to calibrate the checkbook irrigation scheduling system.

A data logging rain gauge was placed within each sugarbeet plot and within the 100% treated potato, wheat, and barley plots. Rain gauges were adjacent to the neutron gauge access tube. These logging rain gauges are battery-powered and automatically record the date and time of each 0.01 inch of rainfall or irrigation. Data from the gauges were used to determine rain and irrigation rates and duration. The data also provided a means to verify that each plot received the correct irrigation amount.

Total rainfall amount from May 1 to September 30 was below normal (Table 1). Monthly totals were below normal in May, June, and July but above normal in August and September. The growing season temperatures were below normal for the entire 2014 growing season.

All cultural practices (tillage, fertilizer, planting populations, chemical, and fungicide applications) are the same for all treatments within a crop to minimize the effects of variables other than water amount. Yield and quality analysis for all the crops was done by the WREC except when mentioned otherwise.

Table 1: Rainfall at Nesson Valley.

	Rainfall	
Month	Normal	2014
	------ *inches* ------	
May	2.23	1.29
June	3.08	2.42
July	2.73	1.33
August	1.64	2.43
September	1.22	1.40
Total	10.90	8.87

Results

Sugarbeet

The sugarbeet trial was planted May 23. The emergence date was May 30. There were 12 irrigations between planting and harvest, the first on July 5 and the final on September 18. The amount of water applied to sugarbeet for the four irrigation treatments (100%, 67%, 33% and 0%) was 7.0, 4.6, 2.5, and 0.0 inches, respectively, according to the rain gauges located within each plot. Rainfall recorded from planting through harvest was 7.3 inches, so that the total water received by the four treatments was 14.3, 11.9, 9.8, and 7.3 inches, respectively.

The rainfall and irrigation amounts measured by the recording rain gauges (Fig. 1a) were lower than the total water received. This discrepancy was because the rain gauges were installed on June 16 and rainfall was recorded from planting through harvest.

The soil was slightly wetter than field capacity for all four treatments on July 1 (Fig 1b). Irrigation started on July 5 because of the increasing daily water usage, even though soil water content was still at field capacity. This was to maintain adequate soil water content because once depletion begins it is hard to increase.

By August 5, the soil in the 0% and 33% treatments had dried to wilting point and after that lost only a minimal amount of water until August 23 when the plots received .9 inches of rain. The soil water content in the other irrigation treatments continued to decrease, but at a slower rate than before. The soil water content in the full irrigation treatment was sufficient to meet the water demand.

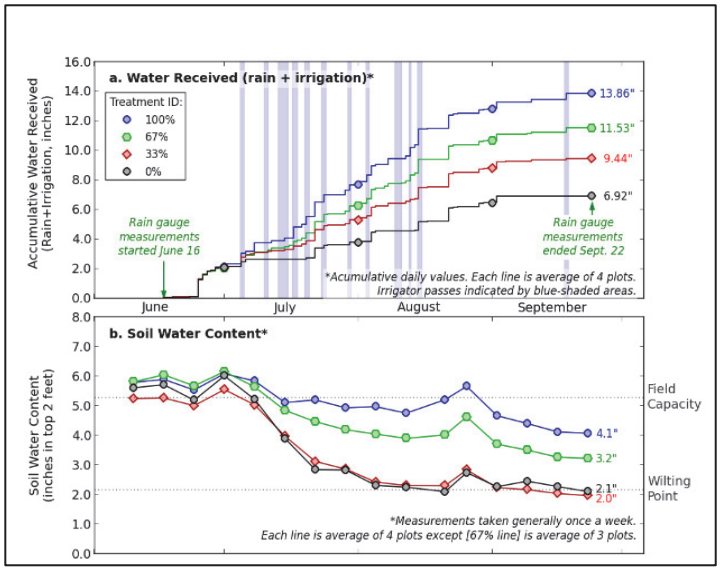


Figure 1: Rainfall, irrigation, and soil water content in sugarbeet.

On September 3, a hailstorm defoliated 100% of the leaf petioles and September 11 the first killing frost occurred. Sugarbeet were harvested on September 23. A sample of sugarbeet from 10 feet of row was obtained by hand from each plot and the number of beets counted. These counts (beets/10ft) were used to determine final plant populations. These samples were analyzed at the Sidney Sugars laboratory and tons per acre and sugar and nitrate percentages were determined. Statistically significant differences in yield and quality occurred among watering treatments (Table 2). The lower yields were a direct result of the storm on September 3 when comparing previous year's yields (Figure 2).

Table 2. Sugarbeet performance.

Irrigation	Population	Yield	Sugar
	beets/10ft	*ton/a*	*%*
0%	21	15.5	19.7
33%	21	22.9	18.8
67%	19	23.2	17.9
100%	20	24.9	16.7
CV (%)	19.7	13.3	4.1
LSD 5%	ns	5.8	1.5

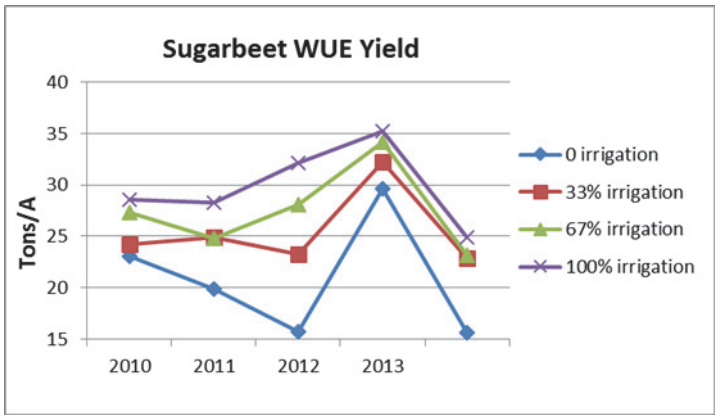


Figure 2

Barley

The Barley was planted May 8. The emergence date was May 15. The first irrigation for barley occurred on June 9 and the final irrigation occurred on July 24. There were nine irrigations, which resulted in 4.1, 2.8, 1.4, and 0. 0 inches of water applied, respectively for the irrigation rates of 100%, 67%, 33% and 0%. Total water received (irrigation plus rain) from planting through harvest was 10.1, 8.8, 7.4, and 6.0 inches, respectively.

The rainfall amounts measured by the recording rain gauges located in 100% treatments (Fig. 3a) were lower than the total water received. This discrepancy was because the rain gauges were installed on June 3 and rainfall was recorded from planting through harvest.

At the beginning of the season soil moisture levels varied (Fig. 3b) between treatments. After the initial measurement, soil moisture in all treatments decreased almost steadily until reaching wilting point. The only exception to this decline was when all treatments increased in soil moisture after a 1.19-inch rainfall on June 26. The two drier treatments reached wilting point on July 22 and the two wetter treatments reached wilting point on August 5.

Barley was harvested on August 20. Yield and quality samples were obtained using a small plot combine. Statistically significant differences in barley yield occurred among watering treatments (Table 3). Yield history can been seen in Figure 4.

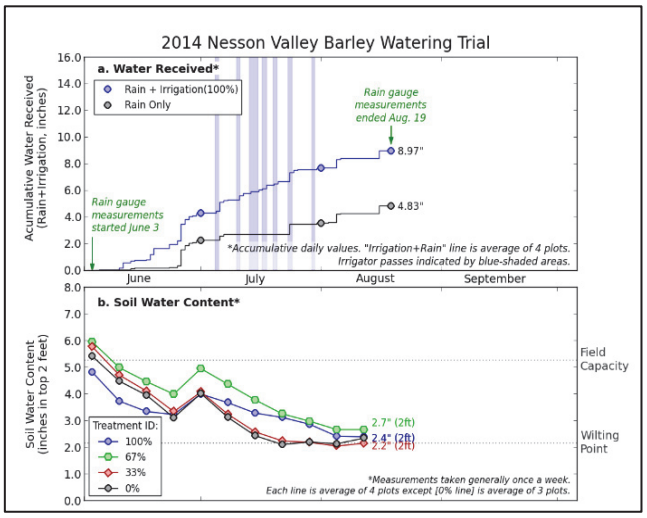


Figure 3: Soil water content in barley.

Table 3. Barley performance.

Irrigation	Yield	TW	Protein
	bu/A	*lb/bu*	*%*
0%	81	51.8	12.0
33%	96	51.7	12.0
67%	106	51.7	11.3
100%	112	51.4	11.3
CV (%)	5.7	0.8	4.8
LSD 5%	9.0	ns	ns

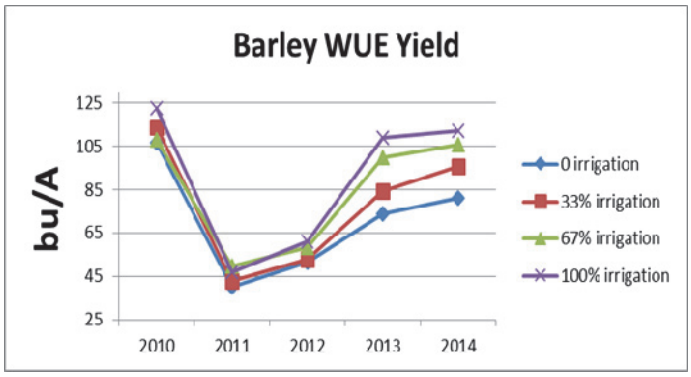


Figure 4

Wheat

The wheat was planted May 2. The emergence date was May 10. There were nine irrigations to wheat. The first on June 9 and the final on July 24. The irrigation rates of 100%, 67%, 33% and 0% resulted in 5.0, 3.4, 1.7, and 0.0 inches of water applied, respectively. Total water received from planting through harvest was 10.8, 9.2, 7.5 and 5.8 inches, respectively. Soil water content in the wheat plots was similar to the barley plots with about 4.5 inches in the top two feet (Fig. 5b). Soil moisture levels were maintained in the three wetter treatments until July 24 when irrigation was suspended due to crop maturity and lodging concern. Soil moisture content declined through crop maturity in the driest treatment. The spread in the soil water content among treatments on the last measurement date was similar to that occurring in barley.

The rainfall amounts measured by the recording rain gauges located in 100% treatments (Fig. 5a) were lower than the total water received. This discrepancy was because the rain gauges were installed on June 3 and rainfall was recorded from planting through harvest.

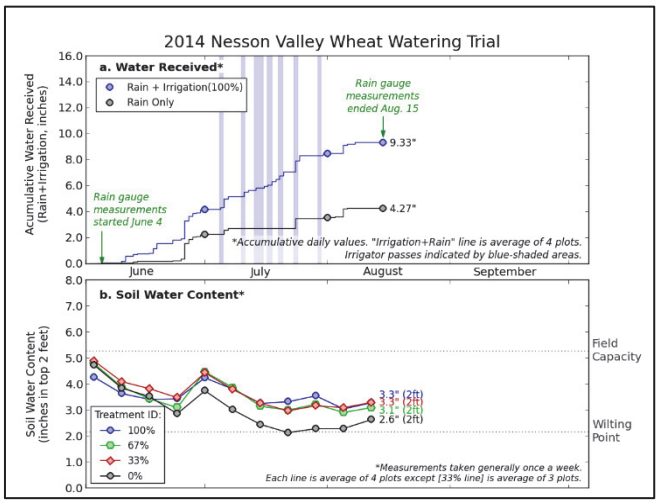
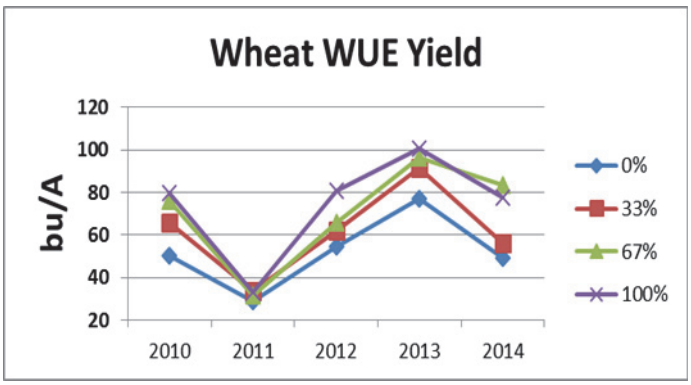


Figure 5: Soil water content in wheat.



Saline Seep Control Project

Jane Holzer (MSCA), Jerald Bergman (WREC), Jim Staricka (WREC), Gautam Pradhan (WREC), Kyle Dragseth (WREC)

The Montana Salinity Control Association (MSCA) was contracted to complete a shallow ground water investigation on a saline-affected Williston Research Extension Center field. The MSCA has over 30 years of experience in site-specific saline seep reclamation. The geological, soil and climatic conditions are similar to portions of eastern MT. The MSCA, a Montana state-wide conservation district based program, agreed to provide technical assistance on this saline seep reclamation to use as an educational outreach activity to MonDak region producers on saline seep reclamation.

MSCA installed ten shallow ground water monitoring wells on August 19-20, 2014. Information is collected on depth to bedrock, depth to static shallow ground water and soil types to identify the local conditions. The ground water wells will be monitored for static water level for approximately six months for seasonal changes. All the data will be evaluated by MSCA for the identification of the recharge area or cause of the saline seep. The Williston Research Extension Center staff will measure the monitoring wells and report the data to MSCA. A map showing ground water flow direction and the main recharge area will be developed along with recommendations for land-use changes. The MSCA reclamation plan will be completed in 2015 and the WREC staff will then determine how the recommendations could be implemented.

The key component to saline seep reclamation is to minimize leaching (movement of water through the soil profile) below the plant-rooting zone in the recharge area up-gradient of the saline seep or discharge area. When moisture is utilized in the plant-rooting zone, the water table in the recharge area is no longer recharged and it is able to return to its natural elevation. Typically saline seep reclamation requires a land-use change or rotation from a wheat-fallow rotation to continuous full season deep root or annual crops and perennial crops in the recharge area. The reclamation process usually requires a 5-7 year period to reclaim the saline area to bring it back into economical production. The saline or discharge area can be planted to salt-tolerant perennial forage to speed up the process and reduce the surface salt accumulation.

2014 Research Update

Irrigated and Dryland Horticultural Crops

Kyla Splichal and Kim Holloway

Hops

In 2009, a preliminary hops variety trial was started with six different varieties. Data was collected from 2010 through 2012. This fall, WREC was awarded a USDA Specialty Crop Block grant that will allow us to expand the variety trial and establish a hop yard with new trellising. Twelve popular hop varieties were selected and planted. When the new trellis is completed, it will allow for vertical growth of the bines up to 20'. Data from this hops variety and research study will allow us to compare varieties for adaptation to Western North Dakota and compare water use efficiencies. A collaborative effort with Dr. Harlene Hatterman-Valenti in Fargo will allow for a similar hops variety and research trial in Fargo, North Dakota.

Onion Variety Trial (Nesson Valley)

The onion variety trial was grown under irrigation and consisted of 16 hybrid varieties that ranged from long day Northern types to Spanish storage. The majority of the varieties were yellow, but included four brown and three red.

Onion Trial	Irrigated							Nesson Valley	
Variety	Seed Source	Days to Maturity	Cwt Acre	Total Bulbs Acre	Single Center %	<2.25"	2 1/4 to 3"	3 to 4"	>4"
						----------Number Bulbs----------			
Crockett	Bejo	118	980	129436	83	2	12	10	1
Oloroso	Nunhems	Not Reported	860	116990	90	4	5	13	1
Campero	Nunhems	Not Reported	769	172581	63	11	16	7	0
Sedona	Bejo	118	743	94588	80	3	4	11	1
Gunnison	Bejo	110	703	84631	53	1	4	11	1
Hamilton	Bejo	118	694	84631	70	1	6	8	1
Valero	Nunhems	Not Reported	669	99566	70	2	6	11	1
Delgado	Bejo	115	560	74675	30	2	3	8	2
Calibra	Bejo	115	440	54761	53	1	3	5	1
Norstar	Takii	Not Reported	435	62229	25	1	5	6	2
Patterson	Bejo	105	424	53102	20	0	3	7	0
Marenge	Nunhems	115	423	74675	30	3	4	7	0
Countach	Nunhems	118	327	53102	20	1	5	5	0
Trekker	Takii	95-100	240	42316	20	1	5	4	0
Ruby Ring	Takii	110-125	224	51442	33	3	5	2	0
Trailblazer	Takii	Not Reported	213	51442	37	3	4	2	0
Mean			544	81260	49	2	6	7	1
C.V. (%)			26.4	25	30.1	100.9	40.7	42.2	107.8
LSD (P= 0 .1)			199.3	28012	20.2	3.6	3.2	4.2	1.3
Planted 5/8/2014				Harvested: 9/4/2014				Previous Crop: Durum	

Soil: Lihen fine sandy loam soil; pH=7.2; 3.2% O.M.; 72 lb. N; 32 ppm P and 300 ppm K.
Previous Crop: Durum
Planting: planted with a Monosem precision planter with 5 rows at 7 ½" spacing wide by 14' ft long. The study had 3 replications.

Fertilizer: 185 lbs. Urea (46-0-0) applied May 15th
Weed/Pest Control: all seed pelleted with differing formulations of insecticide and fungicide per seed company. Prowl H20 (1.5 pt/A) applied on May 14th, and on June 16th Moxy 2E (24 oz/A) + Section 2EC (6 oz/A) were applied for weed control. Hand weeded as needed.

Harvest: One row out of five was harvested from each plot. Onions were bagged and brought back to WREC on September 4th after defoliating hail storm the night before. They were weighed and graded September 5-8th.

Garlic

Last fall on October 7th 2013, WREC planted four varieties of hardneck and one variety of softneck garlic. The garlic was harvested on August 11th, 2014 and dried for 3 days and were weighed on August 14th.

Variety	Weight Lbs	# Bulbs
Cheshok Red	4.6	31
Northern White	2	17
German Porcelain	0.6	13
Inchelium Red *	0	0
Musik *	0	0

Bulbs from Cheshok Red, Northern White and German Porcelain were saved for a fall planting. Inchelium Red and four new varieties (Kettle River Giant, Italian Loiacano, Silver Rose and Elephant) for a total of 8 varieties were planted on October 8th, 2014 for performance testing in 2015. Varieties marked with (*) did not survive over the winter.

Small Fruit

WREC continues to work cooperatively with Harlene Hatterman-Valenti, NDSU high value crops specialist, the ND Grape and Wine Association, and interested local grape growers to evaluate selected fruit bearing plants for wine making, including 22 grape varieties and several varieties each of juneberries, strawberries, raspberries, and rhubarb. In 2011, Haskaps and cherries were added to our fruit selections. We look forward to their first harvest.

Raspberries

In 2006, a high tunnel was constructed in our gardens to facilitate a trial with raspberries. The winter following the construction, the poly film covering was damaged due to high winds and structural failure. In July 2013 the high tunnel was refurbished with permanent end walls and new plastic covering. The interior raspberries suffered from winter kill.

Raspberries were harvested from mid-July to August 5. Both the Boyne and K81-6 varieties continued to produce until after first frost. Next season, the fruit totals of the three varieties will be tallied, but this is an inactive trial.

2014 Raspberry Trial			
	weight (oz.)		
Variety	Inside	Outside	Total
Boyne	13.9	71.6	85.5
Nova	0.8	39.3	40.1
K81-6	0	4.5	4.5
total			130.1

Grapes

The grapes took a hard winter kill that included complete loss of some varieties, dieback to the ground on some, and severe bud damage on others, while yet others had no damage.

Grapes 2014								
Variety	Yield (lbs.)				Brix[1]	pH[2]	RU[3]	# producing
	2012	2013	2014	3 yr. avg				plants
Baltica	0.2	2.2	9.0	3.8	23.3	3.3	254	8
Bluebell	0.0	2.6	8.8	3.8	13.4	3.1	125	10
Brianna	0.0	0.0	0.2	0.1	19.0	3.3	207	1
Edelweiss 1'	49.9	64.4	6.2	40.2	14.8	3.4	171	9
Edelweiss 2'	58.0	58.0	5.2	40.4	15.9	3.3	173	4
Edelweiss 3'	35.5	37.2	0.4	24.4	15.6	3.3	170	2
ES 12-6-18	0.1	8.2	74.6	27.6	19.8	3.1	190	12
ES 5-4-71	0.3	2.4	*	1.3	*	*	*	0
Frontenac S. Vineyard	42.1	135.6	51.2	76.3	22.1	3.1	212	80
Frontenac N. Vineyard	52.8	11.6	26.2	30.2	20.6	3.1	198	12
Frontenac Blanc	No data. All but one winter killed							
Frontenac Gris	2.2	7.0	0.0	3.1	22.0	3.2	225	11
King of the North	5.1	8.0	44.4	19.2	17.4	3.1	167	12
La Crescent	7.1	10.7	26.6	14.8	19.7	3.0	177	12
Marechal Foch	0.1	1.0	1.0	0.7	22.0	3.5	269	2
Marquette	0.0	1.4	2.0	1.1	23.2	3.5	284	3
MN 1131	0.8	6.4	28.0	11.7	22.3	3.4	258	12
Petite Amie	0.0	0.0	0.0	0.0	*	*	*	0
Petite Pearl	No data. Complete loss.							
Prairie Star	0.0	0.8	5.6	2.1	16.9	3.4	195	2
Riparia	0.0	0.2	15.0	5.1	21.8	3.3	237	3
Sabrevois	0.0	1.8	6.6	2.8	14.0	3.4	162	11
Somerset Seedless	0.0	0.3	1.8	0.7	19.7	3.5	138	7
St. Croix	1.3	15.0	1.2	5.9	11.2	3.4	103	6
St. Croix 1'	81.0	153.0	1.2	78.4	16.2	3.5	198	9
St. Croix 2'	46.7	80.2	2.2	43.0	14.6	3.4	169	10
St. Croix 3'	48.3	117.8	3.0	56.4	16.2	3.4	187	6
Valiant	6.7	31.6	115.4	51.2	15.5	3.3	169	12
Total	438.0	757.4	435.8		18	3	193	256

(*) not enough juice
Fertilizer 10-50-0 applied May 23rd at 25lbs/A
Fertilizer 28-28-0 applied June 19th at 30lbs/A
Fertilizer 28-28-0 applied July 14th at 25lbs/A
Petiole samples taken on August 13th

[1]Brix is a measurement of the sugars
[2]pH measures the acidity
[3]RU=Brix X pH² (a factor of ripeness) Optimal is
260 for reds 200 for whites

Juneberries

The juneberries bloomed from April through early May. Noted were a few chronic diseases that will be controlled next year with preventive applications of fungicides. The juneberries set fruit that was picked in the second week of July. The ripening berries were netted in June to protect them from the birds, and it mostly worked, with little loss to them. In WREC's first harvest of this study, 42.86 lbs. of this delicious native berry were harvested. Thanks to everyone who helped!

2014 Juneberries											
Harvest	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6	Row 7	Row 8	Row 9	Row 10	pounds
7/8/2014	1.2										1.2
7/9/2014	0.25	3.2	3.8	0.83							8.08
7/10/2014	1	1.38	0.75	2.2	3.8	0.75					9.88
7/11/2014	0.4	0.5	0.2		4.6	4.6					10.3
7/13/2014						0.2	4	3.6	3.4		11.2
7/14/2014										2.2	2.2
Total lbs	2.85	5.08	4.75	3.03	8.4	5.55	4	3.6	3.4	2.2	42.86
# producing	16	25	18	19	25	21	26	24	22	22	218

NDSU received USDA Specialty Crop Block Grant funding for Juneberry research this summer, and Williston Research Extension Center will continue to conduct Juneberry research as part of this two-year grant project.

Tomato Acidity Trial

Fifteen varieties of tomatoes were planted in a greenhouse on March 18, 2014, and were transplanted out into the garden beds on May 28th and 29th. The three replications were planted into two garden beds, for a total of 400 square feet. Preen was administered before planting to reduce weed pressure. Pea mulch was laid after planting to retain moisture, inhibit weed growth and add nutrients into the soil. Miracle Gro fertilizer, as well as Urea (46-0-0) were applied throughout the growing season.

Early blight attacked in early June. The most severe infections occurred in the 2nd replication and most varietals in that replication produced less than the other two. Interestingly, the 2nd replication of Yellow Pear produced 4 times more than the 1st and 3rd.

The tomatoes were classified into 3 categories; heirloom (Amish Brandywine, Black Krim, Cherokee Purple, Goliath, Old German, Yellow Pear, and Red Zebra), hybrid (Beefmaster, Big Beef, Celebrity, Early Girl, and Golden Fresh Salsa), and roma type(La Roma, Martino's Roma, Viva Italia). Three of the heirloom tomato varieties, Amish Brandywine, Cherokee Purple, and Black Krim, died after planting, in all reps. This was not typical of these varieties.

The purpose of this trial was to test the acidity of the tomatoes, both for fresh eating and as salsa. The reason for greater acidity in the cooked salsa is for better, safer preservation without losing flavor (sweetness). The varieties were tested fresh, made into salsa using a North Dakota State University recipe, tested again, and taken to Fargo for the same testing.

The heirloom category was grown for the full, sweet, large produce, the hybrid varieties for the prolific, hardy, firm tomatoes, and the roma style for their good canning, salsa, firmness variations. The heirloom were sweetest raw, and the hybrids and roma had the best acidity raw and in salsa. Both the hybrid and roma categories turned as sweet in the salsa as the hybrid varieties. We highly recommend growing a few of each of these tomato varieties for your tomato enjoyment next year!

2014 Tomato Variety Trial Acidity Results								
Three categories of fruits and salsa:								
	WREC Results				Fargo Results			
	Fresh	Salsa #1	Salsa #2	Salsa #3	Fresh	Salsa #1	Salsa #2	Salsa #3
Heirloom								
pH (pH meter)	4.06	3.92			4.30	3.90	3.90	
Brix (Refractometer)	5.40	7.50			5.10	6.40	6.90	
TTA (g/100g as acetic)(AOAC 942.15)					0.36	0.58	0.58	
Hybrid								
pH(pH meter)	3.9	3.53			4.20	3.80	3.80	
Brix (Refractometer)	5.20	7.60			4.50	6.30	6.60	
TTA (g/100g as acetic)(AOAC 942.15)					0.32	0.63	0.61	
Roma as is								
pH(pH meter)	3.92	3.12				3.80	3.80	3.80
Brix (Refractometer)	4.90	5.60				6.10	6.20	6.10
TTA (g/100g as acetic)(AOAC 942.15)						0.61	0.63	0.63
Roma blended								
pH(pH meter)		3.12				3.80	3.80	3.80
Brix (Refractometer)		6.00				6.20	6.20	6.10
TTA (g/100g as acetic)(AOAC 942.15)						0.63	0.61	0.57

TTA=titratable acid, the scientifically preferred method of testing acidity.

Vegetable and Flower Gardens

This year WREC planted an Heirloom Variety Demonstration with seeds from a North Dakota organic seed farm to emphasize that heirloom varieties still have their place in the home garden. The vegetables grown included: *Dakota Sport, Crimson Sprinter, Fargo Yellow Pear, Oregon Sprinter* and *Wisconsin 55* tomato varieties; *Dakota Bumble bean* and *Blue Lake Pole* bean varieties; *Sweet Dakota Bliss* beet, *Dakota Tears* onion, *Howden Dakota Strain* pumpkin, *Uncle David's Dessert* squash, *Sweet Dakota Rose* watermelon, and *Homemade Pickles* cucumber. The *Dakota Sport* tomato, *Dakota Tears* onion and *Sweet Dakota Rose* watermelon did not survive transplanting, but all other varieties were extremely productive!

Covering our gardens with various mulches prior to the previous winter significantly reduced weed incidence and also aided in the surprising overwintering of overlooked onion bulbs from the former growing season! On that note, two varieties of asparagus, Jersey Knight and Pacific Purple, were planted this spring on the west side of the garlic bed. WREC planted 20 more daylily varieties from Fargo's NDSU Daylily Collection, and look forward to seeing them in bloom next summer. WREC grew several types of herbs, including dill, basil, cilantro, chamomile, fennel, tarragon, parsley, lemon grass, lavenders, oregano, stevia, sage, and rosemary. They were transplanted May 28th and 29th and produced well past the first frost.

North Dakota Home Garden Trials

Again this year WREC participated in the North Dakota Home Garden Trial administered by Tom Kalb, the NDSU Horticulturist located in Bismarck. WREC grew two varieties of each kind of vegetable, flower, or herb for a total of 11 trials, in 400 square feet. Kale, 2 lettuce, 2 carrots, peas, beans, summer squash, pumpkins, sunflowers and cosmos were planted in late May and burst out of the ground the first week of June. All the garden crops produced well until frost. Be sure to check out everyone's favorite varieties and the results at www.dakotagardener.com/trials/. The comments are helpful in decision-making for home gardening in 2015.

All-America Selections

This year, the National Gardening Board divided the country into regions, and WREC is now appropriately in the Heartland region, comprised of North and South Dakota, Nebraska, Kansas, Montana, and parts of Wyoming and Colorado. WREC grew some favorite flowers, herbs, and vegetables again in the demonstration garden. Drifts of color, waves of huge tomato vines, and pots of old equipment parts amongst the color made this year's demonstration whimsical and memorable. What a wonderful experience it was! The rating and results chart is not in this publication, but is available on the WREC Facebook page.

Other Notable Things

WREC improved our water sprinkler system in the gardens and landscape by adding two holding tanks and hooking up to two water sources; river water and well water. Now the horticultural site has 8400 gallons of storage water available during the growing season. 2015 will be our first full year on this system and WREC expects to have abundant returns with the improved watering and storage system.

WREC added 2500 square feet of a native plant meadow to our garden for pollinators to see if increased pollination activity occurs in the gardens.

This year the strawberry and rhubarb trials were discontinued for different use.

High Tunnel

The raspberries were pulled from inside the high tunnel on August 5-7 due to premature bud break resulting in significant die back early this spring. In order to utilize space, 4 rows of mixed cool season vegetables were planted and were harvested for produce from September 10 through November 10. We will use the high tunnel for planting more vegetables early next season.

News on Agriculture Diversification/Processing

Chet Hill, NDSU Area Ag Diversification Extension Specialist

Mother Nature keeps surprising us with interesting weather. The region received normal precipitation and slightly above average. The unique part of the weather this year was the temperatures and timing of moisture. It was a somewhat cool growing season with one of the warmest temperatures being on our field days. Many small grain disease issues are due to favorable environmental conditions during flower stage.

Here is a summary of some of the projects I have assisted with this past year:

CROPS – The cool growing season produced some tremendous yields for many of the crops grown in the region. However, there were reports of Fusarium head blight or scab. The wet conditions during flowering created the perfect conditions for Fusarium to become a problem. September 12 was our first light frost and we did not receive a hard killing frost until October 4. However, the September 12 light frost did reduce quality and yield in the late season broadleaf and corn crops. Field pea acres in North Dakota remained high and performed very well, while lentil acres remained steady but weather related conditions made for poor yields. Field pea prices have improved slightly from last year, while lentil prices have declined.

For the producers utilizing irrigation, the warm late season crops like corn, soybeans, and sunflowers performed below average due to an early frost. The month of September was warm and aided in the drying of these crops. Disease scouting and fungicide management are still the keys to improve yield and quality management. Weather conditions were ideal this year for disease problems to exist in many of our crops. Alternate crops to small grains work very well, but growers need to apply best management practices including crop rotation and scouting fields frequently to stay on top of potential disease pressure and disease control. Tools are available like the NDAWN weather system website - http://ndawn.ndsu.nodak.edu/ - to assist producers on the risk of disease based on weather conditions.

There is still a strong switch occurring from flood irrigation to pivot irrigation especially in the Lower Yellowstone Valley. Crop production efficiencies will continue to dramatically increase with more efficient water, fertilizer, and disease management practices by producers.

The WREC continued to conduct off-station plots at Arnegard, Crosby and Beach this year. Barley, spring wheat, durum, field peas, conventional lentils and Clearfield lentils were included in the sites. Also included at the sites were canola and safflower. A crop sequence study is in its second year at the center. Multi-year crop rotations and the use of cover crops highlight the study. Some of the crop rotations are fixed having the same crops involved in

WREC – As in the past I utilize the off-station variety trial plots along with the same varieties here at the center to develop information that would assist a producer in making variety selections. Each of the tables has overall averages both in ranking and yield to compare how a particular variety performed among the rest of the varieties. You will find these results at the Williston R/E Center website - http://www.ag.ndsu.edu/WillistonREC

PROJECTS – As the energy industry strengthens in the region, I feel agriculture has an opportunity to work with the energy industry and utilize resources to create new markets in the region. I would like to see the oil transloading facilities diversify and place an agriculture entity on the site as well. Farmers would benefit from the diversification with new grain markets or other types of services! I will continue to update the map for the Mondak region showing the number and location of irrigation pivots and Mondak region of different crop acres. The objective of the irrigation map and crop acre tables is to provide updated information to companies considering locating a processing plant in our region. I continue to receive inquiries from pulse crop processors to determine the viability of Mondak locations for possible processing plants.

WREC FOUNDATION SEED INCREASE UPDATE

Kyle Dragseth, David Weltikol, Cameron Wahlstrom, Kelly Stehr

Hello to you all! We hope you all had a great 2014 growing season and are getting geared up for another great year in 2015. Our foundation seed increase program is keeping plenty busy during the winter months cleaning grain and preparing for what we hope is another successful year!

We are very excited that through a cooperative effort with the North Dakota Game and Fish Department, we acquired a lease on 1,120 acres located on the River bottoms of the Lewis and Clark Wildlife Management Area. This parcel of land is located only 2 miles south of our existing Research Extension Center and will serve as a useful addition to our Foundation Seed Increase Program, allowing us to grow more crop varieties and volume of new and existing crop varieties for pure seed production and distribution to area producers.

Listed below are the varieties available for sale. Please contact the WREC at 701-774-4315, by writing to the Williston Research Extension Center at 14120 Hwy 2, Williston, ND 58801, or by email to NDSU.Williston.REC@ndsu.edu with any questions on the varieties and for pricing and availability. If you are looking to grow a variety not listed please contact us and we will see if that variety is available at one of our other Research Extension Centers or other sources.

Williston Research Extension Center Foundation Seed Increase

Varieties include the following:

HRSW	Peas	Durum	HRWW
Barlow	Cruizer	Joppa	Decade
Mott	K2	Carpio	Ideal
Elgin	Mystique	Mountrail	Jerry
Velva			
Reeder			

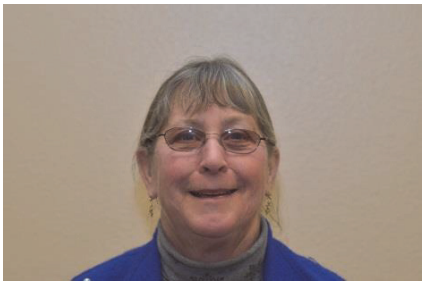
Eastern Agricultural Research Center Foundation Seed Increase

Varieties include the following:

HRSW	Durum
Duclair	Silver

Seed availability and prices can be obtained by calling 406-433-2208, by writing to the Eastern Agricultural Research Center, 1501 N Central Avenue, Sidney, MT 59270, or by email at msu.earc@montana.edu.

MSU Eastern Agricultural Research Center staff



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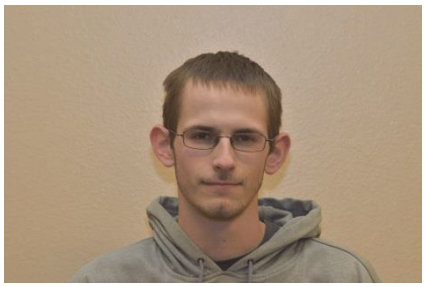

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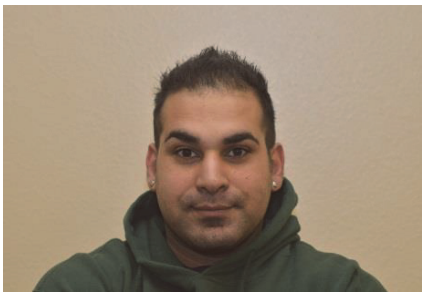

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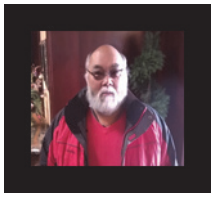
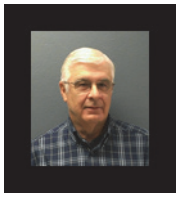
Ag Research Specialist

Consultants



Don Tanaka
Ag Cropping Specialist

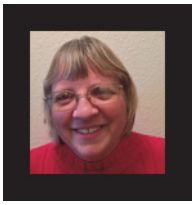


Charles Flynn
Chemist

2014 Summer Staff

Meg Buonforte
Ron Hunt
Moriah Juhl
Ida Purkey
Caitlyn Hofman
Justin Jacobs
Emily Liere
Brad Raab

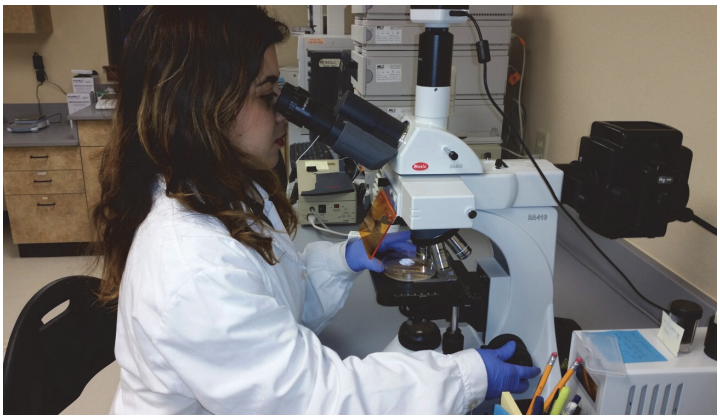
Seasonal Employees



Lynn Staricka

Sandy Spurlock

Eastern Agricultural Research Center 2014



Williston Research Extension Center 2014