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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 2013	Precipitation Avg.	Temperature 2013	Temperature Avg.	*
	- inches -		- degrees F -		
Oct-Dec. 2012	2.74	1.89			
January-March	1.94	1.32			
April	1.11	1.14	36.9	44.6	0
May	5.88	2.16	56.6	56.0	1
June	4.16	2.78	62.6	64.5	0
July	0.97	2.12	68.6	70.1	6
August	4.10	1.43	70.5	68.8	11
September	0.49	1.24	63.8	58.0	4
April-July	12.12	8.20			
April-Sept	16.71	10.87			
Total- Oct 12-Sept13	21.39	14.08			

*Number of Days over 89° F

Last Spring Frost – May 11, 2013 (26.5° F)

First Fall Frost – October 4, 2013 (30° F)

Weather Summary Williston, ND

Month	Precipitation 2013	Precipitation Avg.	Temperature 2013	Temperature Avg.	*
	- inches -		- degrees F -		
Oct-Dec. 2012	2.76	1.74			
January-March	1.16	1.20			
April	0.35	1.16	35.6	46.0	0
May	6.20	2.28	56.6	57.0	2
June	4.21	2.71	63.8	65.0	0
July	1.75	2.24	68.9	72.0	5
August	1.97	1.56	70.7	71.0	13
September	1.53	1.32	64.3	60.0	6
April-July	12.51	8.39			
April-Sept	16.00	11.27			
Total- Oct 12 - Sept13	19.92	14.22			

*Number of Days over 89° F

Last Spring Frost – May 11, 2013 (32° F)

First Fall Frost – October 5, 2013 (25° F)

Off-Station Precipitation* Montana

Site	April	May	June	July	Aug	Total
Flaxville	0.78	3.45	3.43	0.97	1.56	10.19
Nashua	1.15	4.46	4.19	0.95	0.18	10.93
Poplar	0.15	4.32	4.22	1.85	2.70	13.24

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

Off-Station Precipitation* North Dakota

Site	April	May	June	July	Aug	Total
Beach	0.33	6.44	2.37	1.97	1.46	12.57
Crosby	0.17	3.37	3.51	2.81	2.70	12.56
Nesson Valley	0.16	2.87	3.65	2.09	1.04	9.81
Ross	0.44	4.45	5.24	4.67	1.84	16.64
Watford City	0.16	5.34	2.40	1.19	1.74	10.83

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

"The way I see it, if you want the rainbow, you gotta put up with the rain."

Dolly Parton

''The best thing one can do when it's raining is to let it rain."

Henry Wadsworth Longfellow

Hard Spring Wheat Variety Descriptions

					Resistance to[1]					Quality Factors	
Cultivar	Origin	Height	Maturity	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)	WestBred	short	early	MR	NA	A	NS	MS	R	m high	m low
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	WestBred	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	S	S	medium	medium
Buck Pronto	Tigren Seed	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	WestBred	medium	medium	M	NA	NA	NA	NA	MR	medium	medium
Duclair	MSU	medium	medium	R	R	NA	NA	NA	R	medium	medium
Elgin-ND	NDSU	tall	medium	M	R	M	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*	WestBred	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	S	MS	M	NA	m high	m low
LCS Breakaway	Limagrain	m short	m early	M	NA	R	MS	M	NA	m high	medium
LCS Powerplay	Limagrain	medium	medium	M	NA	MR	MS	M	NA	low	m low
LCS Iguacu	Limagrain	short	late	R	NA	NA	MR	MR	S	m high	m low
Linkert	MN	m short	m early	R	R	MR	NA	M	NA	medium	high
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	WestBred	medium	m late	R	NA	MS	MR	S	S	medium	m low
Outlook	MSU	medium	m late	MR	MS	MR	MR	S	S	m low	m low
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
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	WestBred	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 Rowyn	AgriPro	m short	m early	R	NA	NA	NA	MR	S	m high	m low
SY Soren	AgriPro	m short	m early	R	R	MR	M	M	S	m high	medium
SY Tyra	AgriPro	m short	medium	R	R	MR	MS	S	R	medium	m low
SY605CL*	AgriPro	medium	m early	MS	R/MR	MR/MS	MS	S	S	m low	high
Vantage	WestBred	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	WestBred	medium	m late	R	NA	MR	MR	MS	S	high	low
WB-Digger	WestBred	medium	medium	M	MR	MR/MS	NA	MS	S	m low	low
WB Gunnison	WestBred	medium	m early	R	NA	S	S	S	T	m high	medium
WB Mayville	WestBred	short	m early	R	R	MR/MS	MS	S	S	m high	m high

*Clearfield wheat with imidazolinone tolerance

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

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.

Wheat Variety Plots at EARC

Dr. Joyce Eckhoff introducing Dr. Luther Talbert, MSU Bozeman Spring Wheat Breeder, at 2013 EARC Field

Sprinkler Irrigated Spring Wheat* Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	**2012**	**3 yr**	**2012**	**2012**	**3 yr**
Reeder	71.7	67.2	58.7	15.4	15.7
SY605CL	65.3	66.0	59.9	15.5	16.1
Brennan	71.3	65.3	59.7	15.6	15.9
Duclair	61.0	62.4	56.6	15.2	15.2
SY Tyra	64.3	61.1	60.1	14.0	14.3
McNeal	66.5	60.9	56.4	15.7	14.7
Vida	66.7	60.2	57.9	14.2	15.5
WB-Gunnison	67.7	58.8	59.1	14.2	14.7
ONeal	68.0	58.2	57.9	15.0	15.1
Choteau	56.9	58.2	56.9	15.3	15.4
Conan	57.9	57.1	58.6	15.8	15.5
Mott	54.3	56.8	58.2	15.0	14.6
Kelby	49.3	53.4	58.8	16.4	16.4
Corbin	61.5	53.2	58.6	15.0	15.0
Jedd	71.0	52.7	59.1	14.9	14.9
AP604CL	39.0	50.8	59.9	15.5	15.2
Volt	38.7	50.6	57.6	14.8	15.0
Fortuna	51.1	49.6	58.3	15.1	15.4
Thatcher	53.7	45.9	55.9	15.4	15.0
WB Mayville	64.4	--	59.7	15.9	--
WB Rockland	54.7	--	57.2	15.4	--
SY Soren	53.1	--	58.0	15.1	--
Vantage	52.7	--	60.0	16.2	--
Buck Pronto	48.4	--	57.4	16.6	--
LSD 5%	16.5	--	--	--	--

Planted: April 23, 2012 **Harvested:** August 20, 2012
Previous Crop: Safflower
***2013 crop destroyed by hail.**

Dryland Fallow Spring Wheat* Sidney, MT

	Yield bus/a		TW lb/b	Protein %	
Cultivar	**2012**	**3 yr**	**2012**	**2012**	**3 yr**
Reeder	42.0	46.9	58.5	12.7	13.9
Vida	39.1	46.8	57.0	13.3	14.1
Duclair	39.1	44.5	57.0	12.6	13.4
Brennan	44.5	44.3	60.0	13.6	14.4
Kelby	44.8	43.8	60.0	13.5	14.4
Corbin	39.8	43.5	58.0	13.9	13.4
ONeal	35.8	43.3	58.5	13.6	13.0
AP604CL	36.6	42.4	59.0	13.7	13.9
Choteau	36.7	42.2	57.5	13.5	13.6
SY Tyra	35.3	42.0	59.0	13.0	13.2
SY605 CL	34.1	41.9	57.5	15.7	14.7
Jedd	36.2	39.8	59.5	12.8	13.1
McNeal	33.6	38.7	56.0	14.1	13.7
Mott	31.2	37.2	56.5	15.4	14.1
Volt	30.3	37.0	58.0	14.7	13.9
WB-Gunnison	38.7	36.9	58.5	13.4	13.8
Fortuna	38.2	36.8	58.5	12.8	13.7
Conan	29.1	33.2	58.5	14.1	13.9
Thatcher	27.5	32.4	55.0	14.2	14.0
SY Soren	40.4	--	58.0	13.9	--
WB Mayville	34.1	--	58.0	14.4	--
WB Rockland	33.7	--	56.5	15.4	--
Buck Pronto	32.2	--	56.0	15.2	--
Vantage	30.4	--	59.0	16.3	--
LSD 5%	6.2	--	--	--	--

Planted: April11, 2012 **Harvested:** August 2, 2012
***2013 crop destroyed by hail.**

Dryland Recrop Spring Wheat* Sidney, MT

	Yield bus/a		TW lb/b	Protein %	
Cultivar	**2012**	**3 yr**	**2012**	**2012**	**3 yr**
Vida	8.4	35.1	54.5	13.7	14.2
Reeder	13.6	33.0	55.5	13.6	14.4
Outlook	9.5	32.4	54.0	12.7	13.0
Duclair	10.4	31.5	54.0	14.2	13.3
AP604CL	11.5	31.1	54.0	14.5	13.4
Mott	8.9	30.6	55.0	16.7	15.1
McNeal	9.9	30.0	54.5	14.6	13.7
O'Neal	8.4	29.7	52.5	16.2	14.3
Choteau	11.7	29.2	56.0	13.5	13.3
Jedd	12.3	29.1	58.5	12.1	12.2
Corbin	9.0	29.1	55.0	15.0	13.9
Volt	11.6	27.9	58.5	11.0	12.4
Kuntz	11.5	25.2	58.5	12.5	12.9
Hank	13.3	--	53.0	13.8	--
Gunnison	10.6	--	57.0	13.0	--
IMICHT79	9.0	--	56.5	13.2	--
SY Tyra	8.1	--	57.5	13.7	--
Prosper	7.9	--	52.5	14.0	--
LSD 5%	3.1	--	--	--	--

Planted: April 6, 2012 **Harvested:** August 8, 2012
Previous Crop: Spring wheat
***2013 crop destroyed by hail.**

Dryland Recrop Spring Wheat Flaxville, MT

	Yield bus/a	TW lb/b	Protein %
Cultivar	**2013**	**2013**	**2013**
Velva	27.7	61.0	10.9
Reeder	24.6	60.5	10.7
Mott	23.8	60.0	11.9
AP604CL	23.3	60.0	11.6
SY Tyra	23.1	60.5	10.9
McNeal	21.9	58.5	10.9
Vida	21.3	59.0	10.7
Kelby	21.2	59.5	13.2
Elgin	21.0	60.0	10.1
ONeal	20.2	59.5	10.1
Prosper	19.9	59.0	11.4
Duclair	19.7	57.5	10.8
Choteau	19.3	58.5	10.9
WB Gunnison	18.8	59.0	11.9
LSD 5%	11.3	---	---

Planted: May 22, 2013 **Harvested:** September 17, 2013
Previous crop: Spring wheat

Dryland Fallow Spring Wheat
Poplar, MT

	Yield bus/a		TW lb/b	Protein %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
Vida	76.0	62.9	60.0	14.4	14.8
SY Tyra	76.2	61.4	60.5	13.0	13.8
Kelby	74.0	60.9	60.5	15.4	15.8
Mott	71.6	60.9	61.5	14.8	14.9
Prosper	76.7	60.0	61.5	13.4	14.6
Reeder	78.3	59.9	61.0	14.6	15.2
McNeal	76.4	59.6	60.5	15.3	15.0
AP604CL	68.7	58.7	61.5	15.2	15.2
Duclair	67.8	58.7	59.5	14.2	14.6
Jedd	71.2	58.4	60.5	14.0	14.6
Choteau	71.9	58.2	60.0	14.8	15.1
ONeal	67.7	55.2	60.0	14.6	15.2
Volt	64.9	55.2	62.5	14.0	14.1
Gunnison	58.9	52.5	61.0	13.6	14.4
Velva	82.3	--	62.0	14.4	--
Elgin	74.6	--	62.0	15.0	--
LSD 5%	4.7	--	--	--	--

Planted: May 22, 2013 **Harvested:** September 17, 2013

Sprinkler Irrigated Spring Wheat Values
Sidney, MT

	Yield bu/a	TW lbs/bu	Protein %	$/a + or -
Cultivar	**3 yr**	**3 yr**	**3 yr**	**Vida**
SY605CL	66.0	60.0	16.1	87.24
Reeder	67.2	59.1	15.7	86.87
Brennan	65.3	59.9	15.9	79.62
Duclair	62.4	57.0	15.2	10.60
Vida	60.2	57.3	15.5	0.00
Choteau	58.2	57.1	15.4	-20.98
Conan	57.1	59.4	15.5	-32.52
McNeal	60.9	57.3	14.7	-28.59
Kelby	53.4	59.1	16.4	-49.97
Oneal	58.2	56.6	15.1	-44.26
WB-Gunnison	58.8	59.4	14.7	-49.38
SY Tyra	61.1	59.7	14.3	-51.05
Mott	56.8	59.1	14.6	-80.54
Corbin	53.2	57.9	15.0	-94.71
Jedd	52.7	58.0	14.9	-99.76
Fortuna	49.6	57.6	15.4	-111.20
AP604CL	50.8	60.1	15.2	-108.77
Volt	50.6	58.2	15.0	-120.95
Thatcher	45.9	56.0	15.0	-168.37

Wheat data from 2012. Wheat prices summarized by P. Lamb, NARC, Havre, MT, from 3-yr (2010-2012) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee

Dryland Fallow Spring Wheat
Nashua, MT

	Yield bus/a		TW lb/b	Protein %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
Vida	48.7	41.0	59.5	13.8	14.6
Kelby	43.4	39.7	61.5	14.0	15.0
Volt	48.2	39.4	62.5	14.6	14.7
ONeal	43.7	38.6	62.0	15.6	15.1
Mott	49.3	38.2	61.5	14.1	14.7
SY Tyra	42.9	37.4	62.5	12.4	13.5
Prosper	43.4	37.4	61.0	13.2	13.9
Jedd	39.9	37.0	61.0	13.8	14.2
Reeder	42.0	36.9	60.0	14.0	15.3
AP604CL	38.5	35.9	61.0	14.0	14.7
WB Gunnison	41.6	34.7	62.5	13.4	13.7
Choteau	39.6	33.6	59.0	14.4	15.2
McNeal	35.6	33.5	61.0	13.6	14.7
Duclair	33.2	30.0	58.0	14.7	14.4
Elgin	49.5	--	60.5	14.8	--
Velva	46.7	--	62.0	13.1	--
LSD 5%	9.4	--	--	--	--

Planted: May 23, 2013 **Harvested:** September 5, 2013

Dryland Spring Wheat Values
Sidney, MT

	Yield bu/a	TW lbs/bu	Protein %	$/a + or -
Cultivar	**3 yr**	**3 yr**	**3 yr**	**Vida**
Reeder	46.9	59.8	13.9	0.74
Vida	46.8	58.3	14.1	0.00
Brennan	44.3	60.7	14.4	-9.14
Kelby	43.8	60.3	14.4	-12.94
SY605 CL	41.9	59.5	14.7	-23.17
Duclair	44.5	57.8	13.4	-29.43
AP604CL	42.4	60.0	13.9	-32.47
Corbin	43.5	58.8	13.4	-36.53
Choteau	42.2	59.5	13.6	-45.76
Oneal	43.3	59.3	13.0	-50.07
SY Tyra	42.0	60.0	13.2	-53.06
McNeal	38.7	58.0	13.7	-65.19
Mott	37.2	59.2	14.1	-70.84
Volt	37.0	59.8	13.9	-72.32
Jedd	39.8	60.0	13.1	-73.94
WB-Gunnison	36.9	59.7	13.8	-78.22
Fortuna	36.8	59.3	13.7	-78.95
Conan	33.2	60.0	13.9	-100.36
Thatcher	32.4	57.7	14.0	-106.27

Wheat data from 2012. Wheat prices summarized by P. Lamb, NARC, Havre, MT, from 10-yr (2003-2012) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee

Dryland Spring Wheat
Williston, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
LCS Powerplay	44.5	37.6	62.6	13.2	14.5
Vida	36.8	36.8	60.9	12.1	15.3
Forefront	36.6	36.1	62.6	12.8	14.3
Sabin	32.6	35.6	61.1	12.8	14.3
Velva	37.7	35.5	62.0	13.7	15.7
Jenna	39.3	35.3	60.4	12.7	16.2
Elgin-ND	36.1	35.2	61.0	13.8	16.1
Select	36.8	35.2	62.6	12.7	15.5
RB07	32.8	34.7	62.0	13.1	15.5
Barlow	32.1	34.3	62.3	13.3	15.8
Kelby	34.0	34.3	61.4	13.9	16.1
Brennan	33.1	33.8	61.6	13.5	15.8
Glenn	37.8	33.6	63.9	13.7	15.6
Reeder	28.6	33.5	62.5	12.3	15.1
SY Tyra	32.7	33.0	63.3	12.4	15.4
SY Soren	31.8	33.0	62.0	14.0	16.5
Norden	33.4	32.7	63.1	12.7	14.2
Duclair	34.9	32.6	60.7	12.4	15.6
WB-Mayville	28.0	32.5	61.7	12.9	14.8
WB-Digger	28.6	32.4	61.3	12.8	14.4
Breaker	33.5	32.0	63.4	13.0	15.0
Freyr	32.1	31.9	61.0	13.2	15.4
Faller	32.2	31.4	60.4	12.7	15.6
LCS Albany	29.8	31.1	61.5	10.8	15.7
ND901CL	29.3	31.0	61.1	15.5	16.8
Choteau	34.0	30.9	61.0	14.1	16.4
Advance	28.3	30.8	62.6	11.7	14.0
Prosper	33.9	30.8	61.1	13.0	15.4
Briggs	29.0	30.8	61.7	12.5	15.9
Steele-ND	27.9	30.6	62.1	13.0	15.6
Mott	32.1	30.0	62.1	13.6	16.8
Vantage	30.8	29.7	62.5	13.9	15.9
Agawam	29.4	29.5	62.6	12.2	13.8
WB-Gunnison	22.3	29.4	61.1	12.6	15.3
Howard	26.9	29.1	62.3	12.8	15.7
LCS Breakaway	38.5	--	63.1	13.8	--
Linkert	34.3	--	61.6	13.8	--
LCS Iguacu	30.3	--	62.4	11.9	--
Samson	33.4	--	61.0	12.7	--
SY Rowyn	34.9	--	61.0	13.5	--
SY605CL	31.3	--	61.7	12.6	--
LSD 10%	6.7	--	0.5	0.8	--

Planted: May 10, 2013 Harvested: August 26, 2013
Previous Crop: Canola
* Reported on a 12% moisture basis

Sprinkler Irrigated Spring Wheat
Nesson Valley, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
LCS Albany	108.0	77.2	62.0	12.5	15.1
Jenna	100.1	73.5	61.6	13.2	15.7
Velva	105.0	71.7	62.4	13.7	15.8
Faller	101.7	71.1	62.1	13.6	15.6
RB07	96.0	71.1	61.8	14.2	15.9
Rollag	98.6	71.0	62.7	13.5	16.3
Brennan	94.2	70.5	62.3	14.4	15.9
Vida	92.5	70.2	61.0	13.8	15.8
Prosper	100.6	69.9	62.5	13.5	15.6
Kelby	84.4	68.3	62.0	14.5	16.3
SY Soren	85.9	67.6	62.3	14.0	16.1
Barlow	88.6	67.6	63.1	14.6	16.2
Reeder	87.0	67.3	62.0	13.3	16.0
Freyr	80.5	67.3	62.1	13.6	15.5
Mott	86.3	66.7	62.5	15.1	16.5
Glenn	82.2	65.1	64.0	14.2	16.2
Howard	91.2	64.9	62.2	14.3	16.2
Steele-ND	87.4	63.4	62.5	14.6	16.4
ND901CL Plus	88.3	63.2	61.9	15.0	16.7
Duclair	80.7	62.1	60.9	12.0	15.3
Elgin-ND	97.2	--	62.6	14.1	--
LCS Iguacu	97.1	--	62.6	12.3	--
Linkert	94.2	--	62.5	14.7	--
Vantage	89.1	--	63.3	15.2	--
Jedd	87.9	--	63.1	14.0	--
LCS Breakaway	86.1	--	62.9	13.4	--
Briggs	85.2	--	62.2	14.0	--
LCS Powerplay	81.6	--	61.5	12.3	--
LSD 10%	6.7	--	0.5	0.8	--

Planted: May 03, 2013 **Harvested:** August 22, 2013
Previous Crop: Soybean
* Reported on a 12% moisture basis

"There's a solitude and a refreshing connection with nature that you can't get in a city with other people around. We need to realize that we're not above nature, we're simply a part of it."

Bev Doolittle

Dryland Notill Spring Wheat
Arnegard, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**2 yr**	**2013**	**2013**	**2 yr**
Vida	73.6	63.0	57.3	14.8	14.0
Reeder	67.9	61.0	59.1	14.8	14.4
Velva	75.8	60.9	57.8	14.2	13.8
Jenna	70.5	58.0	59.3	13.9	14.3
RB07	59.5	55.5	60.9	14.5	13.9
SY605CL	63.6	54.8	61.7	14.4	14.2
Glenn	66.2	54.1	62.5	14.9	14.7
Howard	66.5	54.1	61.4	14.5	14.1
Elgin-ND	64.6	52.8	59.1	14.8	14.9
Duclair	66.8	52.8	59.5	14.4	13.9
Kelby	53.0	52.7	60.3	15.3	14.8
SY Soren	54.2	52.4	60.1	15.3	15.3
Prosper	66.6	52.0	59.9	14.2	14.3
Barlow	63.5	51.9	60.6	14.9	14.7
Choteau	61.2	51.3	60.1	13.9	14.3
Brennan	45.1	51.3	60.3	14.9	14.5
Steele-ND	54.5	50.6	60.8	14.7	14.3
Mott	61.4	47.7	58.6	15.3	14.8
Breaker	66.7	--	60.4	14.2	--
Advance	66.5	--	61.7	13.5	--
Forefront	61.7	--	61.2	15.2	--
SY Rowyn	60.3	--	60.5	13.7	--
Norden	58.9	--	61.3	13.8	--
Linkert	56.1	--	60.3	15.9	--
LSD 10%	6.2	--	0.9	0.9	--

Planted: May 13, 2013 **Harvested:** August 27, 2013
Previous Crop: Spring wheat
* Reported on a 12% moisture basis

Dryland Notill Spring Wheat
Stanley, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**2 yr**	**2013**	**2013**	**2 yr**
Vida	79.8	57.9	56.8	13.5	13.4
Prosper	73.0	56.4	57.4	12.2	12.7
Duclair	73.6	54.6	57.2	12.8	12.6
Jenna	69.6	54.2	54.5	13.7	13.1
RB07	73.1	53.3	57.5	13.4	13.7
Velva	72.1	53.0	55.7	13.2	13.2
Howard	71.7	51.8	57.9	12.8	13.5
Elgin-ND	69.6	51.7	57.5	12.3	13.1
Kelby	70.8	51.7	57.6	13.7	14.2
Mott	66.1	51.5	57.7	13.5	13.8
Reeder	66.1	51.2	56.4	13.7	13.9
Brennan	76.1	50.9	57.3	13.1	13.2
Barlow	61.8	50.7	59.5	13.3	13.8
Steele-ND	67.4	50.5	57.9	12.8	13.8
SY Soren	66.4	49.7	57.2	13.7	13.7
SY605CL	64.0	49.2	58.7	12.9	13.0
Glenn	69.1	48.3	60.7	13.0	13.9
Choteau	63.9	47.3	53.6	13.3	13.3
Breaker	77.4	--	58.8	12.1	--
Forefront	71.5	--	59.1	13.2	--
SY Rowyn	71.1	--	57.9	13.0	--
Advance	67.8	--	57.3	12.0	--
Norden	65.9	--	59.0	13.6	--
Linkert	65.0	--	57.3	13.8	--
LSD 10%	6.2	--	0.6	0.8	--

Planted: May 15, 2013 **Harvested:** September 9, 2013
Previous Crop: Spring wheat
* Reported on a 12% moisture basis

Let the farmer forevermore be honored in his calling; for they who labor in the earth are the chosen people of God.

- Thomas Jefferson

Because of efficient agriculture management and production practices, American consumers are able to spend less of their disposable income on food.

- *Americans spend only 10 percent of their income on food, whereas the*
- *French spend 18 percent,*
- *British spend 22 percent,*
- *Italians spend 23 percent, the*
- *Japanese spend 26 percent, and*
- *Indians spend up to 51 percent of their income on food.*

Fun Facts! Thank A Farmer

Dryland Notill Spring Wheat
Crosby, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
Reeder	70.1	51.3	58.6	14.9	15.1
Jenna	69.9	51.1	56.4	14.5	14.8
Brennan	75.2	50.0	58.4	15.0	16.0
RB07	76.6	49.9	57.8	15.6	16.0
SY Soren	69.3	49.3	57.9	15.5	16.1
Barlow	77.8	49.0	55.9	15.1	15.7
Glenn	72.5	48.5	56.1	15.7	15.9
Kelby	71.8	48.3	58.1	15.2	16.1
Vida	68.8	48.1	58.4	14.5	14.9
Velva	70.4	48.1	58.2	14.3	14.9
Mott	66.7	47.1	58.2	14.9	15.3
Howard	73.3	47.0	57.6	14.8	15.5
Duclair	68.9	46.4	57.7	14.1	15.0
Prosper	66.5	46.1	58.4	14.5	14.9
SY605CL	61.7	45.6	56.9	16.5	16.2
Steele-ND	68.4	44.7	56.0	15.0	15.7
Choteau	64.4	43.3	59.6	14.6	15.7
Advance	73.8	--	57.6	14.0	--
Breaker	71.5	--	56.3	14.1	--
Forefront	68.0	--	57.5	15.2	--
SY Rowyn	67.5	--	57.6	14.1	--
Norden	66.6	--	57.2	14.4	--
Linkert	65.0	--	57.6	15.5	--
Elgin-ND	63.3	--	56.9	15.4	--
LSD 10%	7.7	--	1.9	0.5	--

Planted: May 15, 2013 **Harvested:** September 13, 2013
Previous Crop: Spring wheat
* Reported on a 12% moisture basis

Dryland Notill Spring Wheat
Beach, ND

	Yield bu/a	TW lb/bu	Protein %
Cultivar	**2013**	**2013**	**2013**
Howard	71.8	59.1	12.2
Velva	69.2	59.0	12.4
Prosper	67.4	58.7	11.3
Vida	66.9	57.6	11.5
Linkert	66.4	58.5	12.9
Advance	66.3	59.1	11.0
Jenna	65.8	57.5	11.6
Forefront	65.7	59.2	12.3
SY Rowyn	65.7	57.5	11.3
Breaker	64.7	60.1	11.5
Barlow	64.4	59.7	12.7
SY605CL	63.6	59.5	12.1
Elgin-ND	63.5	58.3	12.2
RB07	62.6	58.7	12.1
Mott	61.8	58.6	12.0
SY Soren	61.1	59.2	12.3
Reeder	60.7	58.4	12.4
Choteau	59.7	57.7	12.3
Duclair	59.5	56.6	12.0
Norden	59.2	59.6	12.6
Steele-ND	59.2	59.2	12.7
Brennan	58.9	58.5	12.8
Kelby	56.4	58.4	13.7
Glenn	53.7	60.3	13.1
LSD 10%	6.9	0.6	0.9

Planted: May 10, 2013 **Harvested:** September 6, 2013
Previous Crop: Winter wheat
Protein*= Reported on a 12% moisture basis

WREC Plot Planter

He who would look with contempt upon the farmer's pursuit is not worthy the name of a man.

Henry Ward Beecher

"

"If you find yourself in a hole, the first thing to do is stop diggin'."

Will Rogers

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 December 5, 2013. The base price for 14% protein wheat was $6.49, and for terminal durum was $6.00. All spring wheat varieties are compared to Glenn and durum varieties to Mountrail on a plus or minus $/A basis.

	3 Year Avg. (2011-13)			
Cultivar	Yield bu/a	Protein %	Gross Ret $/a	$/A +or- Glenn
Hard Red Spring Wheat				
Vida	36.8	15.3	$253.55	$20.37
Jenna	35.3	16.2	$248.51	$15.33
Elgin-ND	35.2	16.1	$247.81	$14.63
Velva	35.5	15.7	$246.37	$13.19
Kelby	34.3	16.1	$241.47	$8.29
RB07	34.7	15.5	$240.82	$7.64
Barlow	34.3	15.8	$239.76	$6.58
Forefront	36.1	14.3	$237.18	$4.00
Brennan	33.8	15.8	$236.26	$3.08
SY Soren	33.0	16.5	$235.62	$2.44
Sabin	35.6	14.3	$233.89	$0.71
Glenn	33.6	15.6	$233.18	$0.00
Reeder	33.5	15.1	$229.14	-$4.04
Duclair	32.6	15.6	$226.24	-$6.94
ND 901CL	31.0	16.8	$222.89	-$10.29
Choteau	30.9	16.4	$219.08	-$14.10
Breaker	32.0	15.0	$218.88	-$14.30
WB-Mayville	32.5	14.8	$218.40	-$14.78
Faller	31.4	15.6	$217.92	-$15.26
Mott	30.0	16.8	$215.70	-$17.48
Briggs	30.8	15.9	$215.29	-$17.89
Steele-ND	30.6	15.6	$212.36	-$20.82
Prosper	30.8	15.4	$212.21	-$20.97
Vantage	29.7	15.9	$207.60	-$25.58
Howard	29.1	15.7	$201.95	-$31.23
Advance	30.8	14.0	$199.89	-$33.29

	3 Year Avg. (2011-13)			
Cultivar	Yield bu/a	Protein %	Gross Ret $/a	$/A +or- Mountrail
Durum				
Joppa	39.6	15.1	$237.60	$24.60
Maier	38.6	15.6	$231.60	$18.60
AC Commander	38.4	15.6	$230.40	$17.40
Pierce	37.5	15.2	$225.00	$12.00
Tioga	37.3	15.7	$223.80	$10.80
Grenora	37.0	15.1	$222.00	$9.00
DG Max	36.5	15.1	$219.00	$6.00
Ben	36.2	15.9	$217.20	$4.20
Alkabo	35.9	15.0	$215.40	$2.40
Mountrail	35.5	15.7	$213.00	$0.00
Divide	35.5	15.0	$213.00	$0.00
Rugby	35.3	16.0	$211.80	-$1.20
Strongfield	35.2	15.5	$211.20	-$1.80
AC Navigator	34.4	15.4	$206.40	-$6.60
Carpio	34.4	15.4	$206.40	-$6.60
Alzada	34.2	14.9	$205.20	-$7.80
Lebsock	32.6	15.5	$195.60	-$17.40
CDC Verona	32.5	16.3	$195.00	-$18.00

"Agriculture not only gives riches to a nation, but the only riches she can call her own."

Samuel Johnson

Durum Variety Descriptions

Variety	Origin[1]	Height	Maturity	Lodging	Resistance To[2] Leaf Rust	Foliar Disease	Root Rot	Scab	Quality Factors Test Weight	Kernel Size[3]	Grain Protein	Overall Quality
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	ND	medium	medium	R	R	M	M	MS	high	large	m low	good
Alzada	WB	short	early	M	MR	S	M	VS	medium	large	medium	excel
Belfield**	WB	short	early	R	NA	S	NA	S	medium	m large	m low	good
Ben	ND	tall	medium	MR	R	MR	M	S*	v high	v large	m high	average
CDC Verona	Canada	m tall	m late	M	R	MR	NA	S	medium	large	m high	good
Carpio	ND	tall	m late	MS	NA	NA	NA	MR	medium	large	m high	excellent
DG Max	DGP	m tall	medium	M	MR	MR	NA	MS	high	medium	m high	good
Divide	ND	m tall	m late	M	R	M	M	MR	medium	medium	m high	excel
Grande D'Oro	WB/DGP	m tall	medium	MR	R	M	MS	NA	high	m small	medium	average
Grenora	ND	medium	m early	M	R	M	MR	MS	medium	medium	medium	good
Kronos	APB	short	m early	R	NA	NA	NA	NA	medium	large	medium	good
Lebsock	ND	m tall	medium	R	R	M	MS	MS	high	large	medium	average
Maier	ND	m tall	m late	M	R	M	M	S*	high	medium	high	average
Mountrail	ND	m tall	m late	M	R	M	M	S*	medium	medium	medium	average
Pierce	ND	m tall	medium	M	R	MS	MR	S	v high	medium	medium	excel
Primo D'Oro	WB/DGP	tall	m early	MS	R	MS	S	NA	high	medium	m high	good
Silver	MSU	short	early	R	NA	M	NA	S	m high	medium	m high	good
Strongfield**	Canada	m tall	m late	M	R	MS	NA	S	medium	m large	v high	good
Tioga	ND	tall	m late	MR	R	M	NA	MS	m high	medium	m high	excel
VT Peak	Viterra	m tall	medium	MS	NA	NA	NA	S	medium	m small	m high	good
Westhope	WB	m tall	medium	M	R	M	NA	S	m high	m large	medium	good
Westmore	APB	short	early	R	NA	MS	NA	NA	m low	medium	medium	good

[1] Refers to developer. WWW = World Wide Wheat. WB = WestBred. DGP = Dakota Growers Pasta.APB = Arizona Plant Breeders.
[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.
[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

Sprinkler Irrigated Durum*
Sidney, MT

Cultivar	Yield bus/a 2012	Yield bus/a 3 yr	TW lb/b 2012	Protein % 2012	Protein % 3 yr
Grenora	76.9	67.1	58.7	13.4	13.9
Mountrail	82.6	66.1	59.0	14.1	14.0
Tioga	70.4	64.5	59.5	14.0	14.2
Divide	73.2	63.5	59.8	14.3	14.4
Alkabo	78.2	62.4	58.0	13.5	13.9
Strongfield	66.0	56.6	59.0	15.2	15.0
Silver	66.6	47.9	57.5	14.2	14.8
Alzada	58.5	38.9	57.7	14.6	15.0
Belfield	57.1	36.6	58.8	14.4	14.7
DG Max	77.3	--	60.2	14.2	--
Westhope	75.7	--	59.7	14.5	--
Westmore	72.0	--	57.3	15.2	--
Normanno	69.1	--	57.2	14.0	--
Kronos	67.3	--	565.8	14.3	--
LSD 5%	7.2	--	1.5	0.6	--

Planted: April 23, 2012 **Harvested:** August 20, 2012
Previous Crop: Safflower
***2013 crop destroyed by hail.**

Dryland Recrop Durum*
Sidney, MT

Cultivar	Yield bu/a 2012	Yield bu/a 3 yr	TW lb/bu 2012	Protein % 2012	Protein % 3 yr
Divide	3.8	30.7	55.0	15.5	13.4
Alkabo	8.7	30.3	56.5	15.0	13.7
Silver	8.5	29.1	53.0	18.2	14.7
Mountrail	7.0	29.1	53.5	17.3	13.9
Grenora	4.2	29.1	53.5	16.1	13.6
Normanno	9.5	28.8	56.0	11.9	11.5
Tioga	4.1	28.5	55.0	17.4	14.2
Strongfield	4.9	28.2	54.0	18.2	15.1
Pierce	3.3	27.8	54.5	16.9	14.2
Alzada	6.7	26.7	53.0	15.1	13.4
Belfield	9.8	--	55.5	14.8	--
Westhope	5.0	--	55.0	18.7	--
LSD 5%	2.2	--	--	--	--

Planted: April 6, 2012 **Harvested:** August 8, 2012
Previous Crop: Spring wheat
***2013 crop destroyed by hail.**

Dryland Fallow Statewide Durum*
Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2012	3 yr	2012	2012	3 yr
Tioga	36.2	44.4	58.8	14.2	14.0
Mountrail	34.2	44.2	57.2	14.9	14.2
Alkabo	37.4	43.8	59.0	14.6	14.2
Strongfield	32.7	43.0	57.8	13.9	14.5
Grenora	32.9	43.0	57.7	14.3	14.3
Alzada	38.7	42.8	58.0	12.9	13.7
Divide	33.3	42.6	58.8	14.7	14.0
Belfield	34.3	41.6	58.2	13.4	14.0
Silver	31.9	37.0	57.7	14.4	14.4
Kronos	44.7	--	58.2	13.1	--
DG Max	39.0	--	59.8	12.9	--
Westmore	37.2	--	56.3	13.7	--
Westhope	36.9	--	59.5	14.6	--
Normanno	36.0	--	57.8	13.2	--
LSD 5%	5.8	--	1.2	1.7	--

Planted: April 16, 2012 **Harvested:** August 7, 2012

***2013 crop destroyed by hail.**

Dryland Fallow Durum
Nashua, MT

	Yield bus/a		TW lb/b	Protein %	
Cultivar	2013	3 yr	2013	2013	3 yr
Silver	51.6	38.6	62.0	14.2	14.4
Normanno	44.7	38.6	59.5	14.2	13.9
Alkabo	48.7	37.6	62.0	13.7	13.8
Mountrail	49.1	37.6	61.5	14.1	14.2
Alzada	45.3	35.8	60.5	13.0	13.7
Divide	42.8	35.7	60.5	13.5	14.0
Strongfield	43.1	35.6	62.5	14.7	15.0
Grenora	40.0	35.6	61.0	11.9	13.8
Tioga	48.0	34.4	61.0	12.6	14.0
Carpio	49.2	--	60.5	13.2	--
LSD 5%	12.0	--	--	--	--

Planted: May 23, 2013 **Harvested:** September 5, 2013

Dryland Recrop Durum
Flaxville, MT

	Yield bus/a	TW lb/b	Protein %
Cultivar	2013	2013	2013
Tioga	25.3	59.5	10.0
Strongfield	23.9	60.0	11.5
Grenora	23.8	61.5	10.3
Mountrail	23.8	59.0	10.0
Carpio	22.2	59.0	10.3
Divide	22.1	58.5	10.4
Alzada	22.0	58.5	10.2
Alkabo	21.8	60.0	10.0
Silver	19.0	56.5	12.2
Normanno	18.2	56.5	12.1
LSD 5%	6.1	--	--

Planted: May 22, 2013 **Harvested:** September 17, 2013

Previous crop: Spring wheat

Dryland Fallow Durum
Poplar, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	2013	3 yr	2013	2013	3 yr
Mountrail	73.4	59.3	61.0	13.6	15.1
Normanno	65.1	58.1	58.5	13.8	15.4
Alkabo	70.1	55.4	61.5	13.6	14.6
Tioga	74.3	54.4	61.5	13.8	15.3
Grenora	73.6	54.2	60.5	13.1	14.6
Divide	60.6	52.4	60.0	14.4	15.3
Strongfield	67.2	50.0	61.0	14.4	15.9
Silver	60.0	50.0	60.0	12.7	15.2
Alzada	58.9	48.6	59.5	13.4	14.7
Carpio	73.3	--	62.0	13.3	--
LSD 5%	8.0	--	--	--	--

Planted: May 22, 2013 **Harvested:** September 17, 2013

"If ya' done it, it ain't braggin'."

Old Texas saying

I have always said there is only one thing that can bring our nation down - our dependence on foreign countries for food and energy. Agriculture is the backbone of our economy."

John Salazar

Dryland Durum
Williston, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	2013	3 yr	2013	2013	3 yr
Maier	47.9	38.6	61.1	15.4	15.6
AC Commander	47.4	38.4	61.0	14.4	15.6
Pierce	51.3	37.5	61.2	14.2	15.2
Tioga	49.7	37.3	61.6	14.5	15.7
Grenora	48.7	37.0	60.2	14.1	15.1
DG Max	43.7	36.5	61.8	14.7	15.1
Ben	46.8	36.2	61.0	15.3	15.9
Alkabo	46.6	35.9	61.4	14.1	15.0
Mountrail	48.4	35.5	60.2	15.3	15.7
Divide	43.1	35.5	61.6	15.0	15.2
Rugby	40.9	35.3	60.4	15.9	16.0
Strongfield	44.7	35.2	60.7	14.8	15.5
Carpio	43.6	34.4	61.2	14.8	15.4
AC Navigator	41.8	34.4	61.5	14.5	15.4
Alzada	39.7	34.2	60.2	13.9	14.9
Lebsock	42.5	32.6	61.1	14.9	15.5
CDC Verona	42.4	32.5	61.0	15.3	16.3
VT Peak	52.4	--	62.6	14.7	--
LSD 10%	5.2	--	0.7	0.8	--

Planted: May 6, 2013 **Harvested:** August 23, 2013
Previous Crop: Soybean
* Reported on a 12% moisture basis

Dryland Notill Durum
Stanley, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	2013	2 yr	2013	2013	2 yr
Grenora	69.4	50.5	57.8	11.5	12.5
Lebsock	68.6	49.2	58.6	12.0	12.6
Pierce	65.2	48.7	59.1	12.3	13.2
Divide	69.1	48.5	56.2	12.5	13.4
Mountrail	70.7	47.8	57.1	11.9	13.5
DG Max	66.7	46.9	58.0	12.6	13.8
CDC Verona	61.8	46.6	55.4	13.7	14.2
Strongfield	67.5	45.8	56.9	13.3	14.1
Carpio	60.3	43.8	56.5	12.2	13.1
Alkabo	55.3	42.8	55.7	11.8	12.7
Ben	63.1	42.8	58.8	12.2	13.4
AC Commander	54.6	38.5	53.1	12.5	13.5
Tioga	52.9	37.8	54.4	12.1	12.9
Maier	46.4	37.1	55.9	13.1	13.8
AC Navigator	51.5	35.1	53.7	12.8	13.7
Silver	36.7	27.9	49.0	13.3	14.0
Alzada	32.7	27.2	49.2	13.4	13.7
VT Peak	72.5	--	59.6	12.0	--
Rugby	59.5	--	58.4	12.1	--
LSD 10%	10.7	--	2.2	0.7	--

Planted: May 15, 2013 **Harvested:** September 9, 2013
Previous Crop: Spring wheat
* Reported on a 12% moisture basis

Dryland Notill Durum
Beach, ND

	Yield bu/a	TW lb/bu	Protein* %
Cultivar	2013	2013	2013
Maier	83.4	63.0	11.7
Grenora	80.8	62.3	11.4
Tioga	77.7	63.4	10.5
Lebsock	77.7	64.0	11.0
DG Max	75.8	63.5	10.8
Mountrail	72.1	62.8	11.0
Alkabo	71.4	63.3	11.3
Rugby	71.3	63.2	11.6
VT Peak	71.1	64.7	11.2
Pierce	69.4	63.9	11.1
CDC Verona	68.6	62.8	11.5
Strongfield	67.2	63.0	11.6
AC Commander	66.8	61.7	11.2
Divide	66.2	63.4	11.1
Ben	65.7	63.3	11.5
Carpio	61.3	63.7	10.9
AC Navigator	60.1	62.7	11.4
Alzada	47.9	60.6	12.2
Silver	46.8	60.9	12.6
LSD 10%	6.2	0.4	0.6

Planted: May 10, 2013 **Harvested:** September 6, 2013
Previous Crop: Winter wheat
* Reported on a 12% moisture basis

Dryland Notill Durum
Crosby, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	2013	3 yr	2013	2013	3 yr
Maier	64.8	43.3	54.7	14.4	15.0
Pierce	62.6	42.9	55.6	14.3	14.6
Grenora	58.5	42.9	53.6	14.3	14.4
Mountrail	60.0	42.3	53.2	14.1	15.1
Tioga	60.1	40.1	53.2	14.6	14.6
CDC Verona	55.0	39.9	54.0	16.4	15.6
Divide	54.6	39.9	54.1	15.6	15.2
Lebsock	49.9	39.9	54.4	14.8	14.5
Ben	53.8	37.6	52.3	15.1	15.6
Alkabo	49.1	37.5	53.1	15.1	14.8
Strongfield	45.2	37.4	53.4	16.8	16.1
AC Commander	50.3	35.5	49.7	14.7	14.6
DG Max	45.7	33.8	55.0	14.9	15.5
AC Navigator	49.6	33.0	51.4	14.7	14.8
Alzada	40.2	28.1	47.1	14.8	14.8
Rugby	59.3	--	55.5	14.5	--
VT Peak	57.8	--	57.2	14.2	--
Carpio	57.7	--	55.1	14.1	--
Silver	38.9	--	50.7	15.0	--
LSD 10%	6.4	--	1.1	0.6	--

Planted: May 15, 2013 **Harvested:** September 13, 2013
Previous Crop: Spring wheat
* Reported on a 12% moisture basis

Dryland Notill Durum
Arnegard, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**2 yr**	**2013**	**2013**	**2 yr**
Lebsock	55.0	53.7	59.6	13.4	13.8
Grenora	61.2	53.1	59.2	12.7	13.4
Pierce	56.9	51.1	59.2	13.1	13.5
Maier	52.3	50.3	59.1	13.9	15.3
Carpio	56.2	49.6	58.8	13.4	13.5
Tioga	54.8	49.3	59.0	13.3	12.6
CDC Verona	61.2	48.5	57.4	14.3	14.4
AC Commander	57.2	48.1	57.3	13.3	13.4
Divide	53.4	46.8	58.3	14.3	14.0
Ben	52.8	46.4	59.3	14.4	14.7
AC Navigator	53.7	46.0	57.4	13.0	13.7
Mountrail	64.4	46.0	59.0	12.9	13.7
Strongfield	49.8	45.7	58.9	15.2	14.0
Alkabo	51.8	44.4	59.4	12.3	12.1
DG Max	45.5	43.7	60.0	13.7	13.8
Silver	35.6	40.6	56.5	13.6	13.6
Alzada	37.0	33.6	57.4	12.7	13.5
VT Peak	62.9	--	59.6	13.3	--
Rugby	59.6	--	60.2	13.7	--
LSD 10%	8.5	--	1.2	1.1	--

Planted: May 13, 2013 **Harvested:** August 27, 2013
Previous Crop: Spring wheat
* Reported on a 12% moisture basis

Sprinkler Irrigated Durum Wheat
Nesson Valley, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
Joppa	117.0	70.6	63.0	13.5	15.2
Carpio	106.5	66.1	63.3	13.8	15.9
Mountrail	103.8	65.0	62.3	14.3	16.1
Grenora	95.0	62.4	61.7	14.0	15.5
Tioga	90.2	62.2	62.2	13.2	15.4
Pierce	79.5	57.4	63.1	13.8	15.5
Alkabo	83.8	57.4	63.1	13.8	15.6
Divide	80.1	57.4	62.8	13.8	15.7
CDC Verona	87.4	56.9	62.0	15.4	17.5
Lebsock	79.5	56.4	63.2	13.9	15.6
AC Commander	83.9	54.5	61.0	13.9	15.9
Strongfield	64.8	50.3	62.1	15.7	17.4
Alzada	70.9	49.2	59.8	13.9	15.9
VT Peak	89.6	--	63.4	14.7	--
Ben	87.3	--	63.5	14.6	--
AC Navigator	87.3	--	61.6	14.0	--
Rugby	85.4	--	62.8	14.8	--
Maier	85.1	--	63.1	14.1	--
DG Max	79.1	--	62.9	13.9	--
Silver	77.8	--	60.4	13.8	--
DG Star	73.6	--	61.8	14.6	--
Normanno	66.1	--	58.2	13.8	--
LSD 10%	16.3	--	0.6	0.7	--

Planted: May 03, 2013 **Harvested:** August 22, 2013
Previous Crop: Soybean
* Reported on a 12% moisture basis

Did you know?

At one time, much of our population was involved in farming - in 1940, the average farmer grew enough food for only 19 other people. And that was pretty close to enough.

Today, since farmers only account for two percent of the American population, they have to work a lot harder to feed everyone - and they're still doing a great job. In 2006, the average American farmer grew enough food for 144 other people. We say: ***Keep up the good work!***

Because so few of us live on farms now, those who work in agriculture feel it's especially important that non-farmers learn about agriculture.

Potato blossom at WREC

Hard Winter Wheat Variety Descriptions

						Resistance To[1]			Quality Factors	
Cultivar	Origin	Height	Maturity	Winter Hardiness[2]	Lodging	Stem Rust	Leaf Rust	Foliar Disease	Test Weight	Grain protein
AC Broadview	Canada	medium	medium	good	R	R	R	NA	medium	medium
AC Flourish	Canada	short	early	good	R	MR	MR	NA	medium	m low
Accipiter	Canada	short	medium	good	R	R	MS	S	medium	medium
Alice (HWWW)	SD	short	early	fair	MR	MR	S	NA	m high	m low
Art	AgriPro	m short	m early	fair	R	R	R	MS	high	m high
Bearpaw*	MT	m short	medium	fair	R	R	S	NA	medium	low
Boomer	WestBred	medium	medium	good	R	R	MR	S	high	med
Bynum*/**	MT/WB	m tall	medium	fair	MS	MR	NA	NA	low	high
CDC Falcon	Canada	m short	medium	good	M	R	MS	MS	medium	m low
Cowboy	WY/CO	medium	m late	poor	MR	NA	NA	NA	medium	medium
Curlew	Utah	medium	late	poor	MR	NA	NA	NA	m low	medium
Darrell	SD	medium	medium	good	R	R	S	MR	m high	medium
Decade	MT/ND	medium	m early	good	R	R	S	M	medium	medium
Expedition	SD	medium	medium	fair	R	R	MS	MS	low	medium
Genou*	MT	medium	medium	poor	MS	MS	S	NA	m low	medium
Ideal	SD	short	medium	good	R	MR	MR	MS	medium	medium
Jagalene	AgriPro	short	early	poor	R	MR	S	S	high	medium
Jerry	ND	medium	medium	good	MR	R	MR	M	medium	m high
Judee*	MT	medium	medium	fair	R	S	S	NA	medium	m high
Ledger	WestBred	short	m early	fair	R	NA	NA	NA	medium	medium
Lyman	SD	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
Norris**	MT/WestBred	m tall	medium	good	MS	NA	NA	MR	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*	MT	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 (SRWW)	Canada	medium	medium	good	MS	MR	MS	R	medium	low
SY Wolf	AgriPro	m short	medium	poor	R	R	MR	MR	high	m low
WB-Grainfield	WestBred	short	m late	good	MR	NA	MR	MS	m low	medium
WB-Matlock	WestBred	medium	medium	good	MR	R	MS	MS	medium	medium
WB-Quake*	WestBred	medium	late	fair	MR	NA	MR	NA	m low	m low
Wesley	NE	short	early	v good	R	R	MR	MR	high	medium
Yellowstone	MT	med	med	good	M	S	MS	M	low	m high

* Sawfly resistant **Clearfield wheat with imidazolinone tolerance

[1] Refers to developer: WB = WestBred,
[2] R = resistant, MR = moderately resistant, M = intermediate, MS = moderately susceptible, S = susceptible, VS = very susceptible, NA = data not available.
[3] Varieties with fair to poor winter hardiness should not be seeded on bare soil.

"With the new day comes new strength and new thoughts."

Eleanor Roosevelt

Dryland Fallow Winter Wheat*
Sidney, MT

	Yield bu/a		TW lb/bu	Protein %	
Cultivar	**2012***	**3 yr**	**2012**	**2012**	**3 yr**
Overland	56.8	66.5	60.5	11.1	11.9
Jerry	66.0	66.3	58.0	11.4	12.4
Yellowstone	63.7	65.0	59.5	12.2	12.4
Accipiter	59.4	63.4	56.0	11.2	11.6
Broadview	58.2	61.2	57.5	10.7	12.0
Decade	55.4	60.7	60.0	11.9	12.3
CDC Falcon	62.0	60.3	58.5	12.5	12.1
Promontory	64.4	58.0	60.5	11.6	12.0
Norris (CL)	54.8	57.4	60.5	11.6	12.1
Peregrine	54.4	55.4	57.5	12.4	12.2
Bearpaw	60.4	55.2	58.0	11.3	11.4
Radiant	56.0	55.2	56.0	10.5	11.8
Pryor	62.4	55.2	57.5	10.0	11.9
Jagalene	57.4	54.2	60.5	11.4	12.2
Curlew	58.4	53.8	59.0	11.7	12.4
Carter	49.9	51.1	59.5	11.5	12.5
Judee	51.9	49.4	58.0	11.0	12.4
Genou	53.4	48.7	59.0	13.9	13.6
WB Quake	49.4	48.6	56.5	13.3	12.4
Art	46.8	48.0	60.5	11.9	12.7
Ledger	46.3	46.4	58.5	11.3	12.0
Rampart	44.0	42.3	57.5	11.5	12.3
Bynum (CL)	48.3	42.1	59.5	12.6	13.1
Robidoux	56.4	--	58.5	11.7	--
SY Wolf	54.2	--	60.5	10.6	--
McGill	53.6	--	58.5	11.5	--
LSD 5%	9.6	--	--	--	--

Planted: October 13, 2011 **Harvested:** July 31, 2012

***2013 crop destroyed by hail.**

Dryland Hard Red Winter Wheat Values
Sidney, MT

	Yield bu/a	TW lbs/bu	Protein %	$/a + or -
Cultivar	**3 yr**	**3 yr**	**3 yr**	**Falcon**
Jerry	66.3	58.3	12.4	48.59
Overland	66.5	60.2	11.9	40.62
Yellowstone	65.0	58.7	12.4	39.89
Accipiter	63.4	58.2	11.6	8.90
Decade	60.7	59.6	12.3	6.87
Broadview	61.2	58.4	12.0	5.90
CDC Falcon	60.3	58.4	12.1	0.00
Promontory	58.0	60.6	12.0	-15.06
Norris (CL)	57.4	60.5	12.1	-18.99
Peregrine	55.4	58.8	12.2	-28.21
Pryor	55.2	57.8	11.9	-33.40
Curlew	53.8	58.6	12.4	-35.04
Jagalene	54.2	60.4	12.2	-36.16
Radiant	55.2	58.1	11.8	-40.02
Bearpaw	55.2	58.6	11.4	-43.34
Carter	51.1	59.7	12.5	-53.10
Genou	48.7	58.6	13.6	-62.83
Judee	49.4	58.3	12.4	-64.47
WB Quake	48.6	57.8	12.4	-69.83
Art	48.0	59.6	12.7	-70.48
Ledger	46.4	58.9	12.0	-91.04
Bynum (CL)	42.1	59.7	13.1	-107.84
Rampart	42.3	58.8	12.3	-114.93

Wheat data from 2012. Wheat prices summarized by P. Lamb, NARC, Havre, MT, from 10-yr (2003-2012) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee

☼ Wheat field at EARC ☼

"When you're young and you fall off a horse, you may break something. When you're my age, you splatter."

-Roy Rogers

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%	30.0	10.9	--	0.6	0.7	--

Planted: September 21, 2012 **Harvested:** August 13, 2013
Previous Crop: Soybean
* 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: September 26, 2012 **Harvested:** August 15, 2013
Previous Crop: Spring Wheat
* Reported on a 12% moisture basis

Emily Lierle, WREC summer staff, planting potatoes

We believe ranchers and farmers and family business owners can make better decisions about the future than the government can."

~George Bush

BARLEY VARIETY DESCRIPTIONS

Variety	Origin[1]	Use[2]	Height	Maturity	Lodging	Resistance To[3]				Quality Factors	
						Stem Rust	Loose Smut	Net Blotch	Spot Blotch	Test Weight	Grain Protein
Two-Row											
AC Metcalfe*	Canada	F/M	medium	m late	M	MR	MR	MS	MS	medium	medium
Amsterdam	MT	F/M	m short	medium	MR	NA	NA	NA	NA	m low	m high
CDC Copeland*	Canada	F/M	tall	m late	MS	MR	S	MS	VS	low	medium
Conlon*	ND	F/M	m short	early	MS	S	S	MR	MS	m high	m low
Conrad*	BARI	F/M	m short	m late	MR	NA	S	NA	NA	m high	m low
Craft*	MT	F/M	tall	medium	MR	NA	S	S	NA	m high	m high
Eslick	MT	F	medium	m late	MS	S	NA	NA	MS	medium	m low
Geraldine	MT	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	MT	F	m tall	medium	MS	S	S	S	MS	v high	medium
Hockett*	MT	F/M	medium	medium	MS	S	S	NA	NA	medium	m high
Lilly	Germany	F	short	medium	MR	S	NA	S	MR	medium	medium
Pinnacle*	ND	F/M	medium	m late	MR	S	S	MS	MR	high	low
Rawson	ND	F	medium	medium	MR	S	S	MR	MR	high	m low
Scarlett*	Germany	M	short	late	M	S	NA	NA	NA	medium	medium
Six-Row											
Celebration*	BARI	F/M	m short	medium	R	S	S	MS-S	MR/R	medium	medium
Innovation	BARI	F/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 tall	m early	MS	S	S	MR	MS	m low	medium
Rasmusson	MN	F/M	m short	medium	R	S	S	MS-S	MR/R	medium	m low
Robust*	MN	F/M	tall	medium	MS	S	S	MS-S	MR/R	medium	m high
Stellar-ND*	ND	F/M	m short	medium	R	S	S	MS-S	MR/R	medium	m low
Tradition*	BARI	F/M	medium	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	MT	H	tall	medium	S	NA	S	NA	NA	low	medium
Hays	MT	H	m tall	medium	MS	NA	NA	NA	NA	low	medium
Lavina	MT	H	m tall	medium	MS	NA	NA	NA	NA	medium	m high
Stockford	WB	H	m tall	medium	MS	NA	NA	MS	MS	low	medium
Westford	WB	H	tall	medium	S	NA	NA	NA	NA	--	--

1 Refers to developer: BARI = Busch Ag Resources, Inc., WB = WestBred, MT = Montana State University, ND = North Dakota State University,
MN = University of Minnesota,

2 F = feed, M = malt, H = hay, WH = waxy hulless, EVF = enhanced value feed.

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 US.

"The first supermarket supposedly appeared on the American landscape in 1946. That is not very long ago. Until then, where was all the food? Dear folks, the food was in homes, gardens, local fields, and forests. It was near kitchens, near tables, near bedsides. It was in the pantry, the cellar, the backyard."

Joel Salatin, Folks, This Ain't Normal: A Farmer's Advice for Happier Hens, Healthier People, and a Better World

Dryland Fallow Barley*
Sidney, MT

Cultivar	Yield bu/a 2012	Yield bu/a 3 yr	TW lb/bu 2012	Plump % 2012	Protein % 2012	Protein % 3 yr
Conrad	40.0	58.8	46.0	47	13.7	14.3
Hockett	31.5	56.9	47.0	64	11.9	12.2
Scarlett	38.5	55.1	46.5	43	13.3	12.5
Craft	33.8	52.3	45.0	20	13.0	12.2
Haxby	38.6	51.6	49.5	40	12.0	11.6
Tradition	37.6	51.6	45.5	46	11.4	11.9
Harrington	27.4	50.6	43.0	48	14.0	12.3
Metcalfe	30.2	48.7	48.5	80	12.5	11.9
Pinnacle	28.0	47.3	45.0	65	12.7	11.2
Geraldine	33.1	47.0	46.0	36	13.6	14.9
Amsterdam	24.0	45.4	46.0	47	15.3	13.9
Eslick	38.1	--	46.0	22	13.8	--
Expedition	34.6	--	49.0	62	12.5	--
Hays*	31.5	--	43.0	32	12.5	--
Cowboy*	17.2	--	45.0	31	13.2	--
LSD 5%	5.8	--	--	--	--	--

Planted: April 10, 2012 **Harvested:** July 31, 2012
*Forage Barley
***2013 crop destroyed by hail.**

Dryland Recrop Barley*
Sidney, MT

Cultivar	Yield bu/a 2012	Yield bu/a 3 yr*	TW lb/bu 2012	Plump % 2012	
Haxby	21.5	37.6	48.0	6	--
Conrad	14.9	35.6	45.5	44	--
Hockett	16.9	37.1	44.0	18	--
Gallatin	19.0	35.9	42.0	8	--
Metcalfe	15.5	35.0	43.0	7	--
Harrington	18.8	34.4	42.5	5	--
Geraldine	14.5	33.6	43.5	7	--
Tradition	19.9	29.6	46.0	33	--
Amsterdam	14.9	29.7	44.5	22	--
Champion	21.2	--	41.5	7	--
Esclick	16.7	--	42.5	1	--
Cowboy*	14.0	--	44.0	24	--
LSD 5 %	3.2	--	--	--	--

Planted: April 6, 2012 **Harvested:** August 8, 2012
Previous Crop: Spring wheat
* Forage Barley
***2013 crop destroyed by hail.**

Non Irrigated Malt Barley*
Sidney, MT

Cultivar	Yield bu/a 2012	Yield bu/a 3 yr	TW lb/bu 2012	Plump % 2012	Protein % 2012	Protein % 3 yr
Rawson	71.2	--	47.5	91	12.3	--
Celebration	69.1	--	44.0	57	15.8	--
Stout	65.1	--	44.5	73	13.4	--
Lacey	65.0	--	45.0	57	14.7	--
Innovation	64.7	--	46.5	75	13.8	--
Rasmussen	64.6	--	44.0	58	14.5	--
Stellar-ND	63.7	--	45.5	61	13.4	--
Quest	61.7	--	46.5	66	14.6	--
Conlon	61.7	--	49.0	87	13.1	--
Robust	59.7	--	44.5	51	15.1	--
Tradition	59.5	--	45.0	58	14.6	--
Copeland	58.2	--	44.0	58	15.0	--
Haxby	58.0	--	48.5	61	16.1	--
Pinnacle	53.4	--	44.5	70	12.8	--
Conrad	53.1	--	45.5	72	16.1	--
Lilly	52.9	--	46.0	84	14.9	--
Merit	50.5	--	45.0	51	16.4	--
AC Metcalfe	50.4	--	45.0	48	16.0	--
Merit 57	49.2	--	43.5	42	16.9	--
LSD 5%	11.6	--	--	--	--	--

Planted: April 23, 2012 **Harvested:** August 16, 2012
Previous Crop: Spring wheat
***2013 crop destroyed by hail.**

Sprinkler Irrigated Malt Barley*
Sidney, MT

Cultivar	Yield bu/a 2012	Yield bu/a 3 yr	TW lb/bu 2012	Plump % 2012	Protein % 2012	Protein % 3 yr
Innovation	108.3	98.3	47.5	79	14.2	12.8
Rasmussen	107.3	96.7	47.5	68	14.4	13.3
Lacey	105.0	96.1	48.5	84	13.9	12.8
Rawson	104.3	94.9	47.5	83	12.8	12.6
Stout	102.7	89.3	46.5	82	13.6	12.8
Quest	93.3	89.1	47.0	73	14.7	13.4
Lilly	94.0	89.0	48.5	78	14.0	13.1
Tradition	90.3	88.3	47.5	74	14.3	12.9
Haxby	95.3	88.1	48.5	62	13.1	12.9
Robust	94.6	86.9	49.0	76	14.8	13.8
Conlon	87.3	83.7	49.5	88	13.1	13.2
Celebration	87.1	83.5	46.0	76	15.4	14.1
Copeland	76.2	52.4	46.5	76	15.2	13.3
Pinnacle	93.1	80.0	48.0	87	11.6	11.8
Stellar-ND	94.5	79.2	47.5	83	13.2	12.6
AC Metcalfe	72.7	73.5	47.0	69	13.8	13.4
Conrad	93.5	--	47.5	73	15.5	--
Merit	91.1	--	47.0	76	15.3	--
Merit 57	75.2	--	46.5	68	14.6	--
LSD 5%	15.5	--	--	--	--	--

Planted: April 23, 2012 **Harvested:** August16, 2012
Previous Crop: Safflower
***2013 crop destroyed by hail.**

Dryland Barley
Williston, ND

	Yield bu/a		TW lb/bu	Plump %	Protein* %	
Cultivar	**2013**	**3 yr**	**2013**	**2012**	**2013**	**3 yr**
TWO ROW						
Hockett	76.5	73.1	50.7	90.3	14.2	15.4
Rawson	81.4	71.7	50.3	97.0	13.2	13.2
Pinnacle	86.4	70.3	50.4	94.6	12.6	13.3
Conrad	80.2	69.0	49.1	93.9	15.0	15.1
Conlon	74.0	66.4	50.5	97.2	14.4	14.6
AC Metcalfe	81.1	63.7	50.1	89.0	14.4	15.7
CDC Copeland	78.0	63.2	48.5	89.5	14.0	15.3
SIX ROW						
Innovation	80.4	69.9	47.8	88.9	14.8	14.9
Celebration	72.6	67.9	47.9	91.7	15.6	15.9
Tradition	74.5	66.8	48.5	87.2	14.8	14.2
Stellar-ND	78.5	65.1	47.7	88.5	14.6	14.4
Robust	72.6	63.8	48.0	83.4	14.6	15.0
Lacey	71.9	63.3	48.3	85.3	15.0	15.1
Quest	65.6	62.1	49.2	86.8	14.3	14.7
LSD 10%	8.4	--	0.6	4.1	0.9	--

Planted: May 3, 2013 **Harvested:** August 21, 2013
Previous Crop: Soybean
*Reported on a 12% moisture basis

Dryland Notill Barley
Stanley, ND

	Yield bu/a		TW lb/bu	Plump %	Protein* %	
Cultivar	**2013**	**2 yr**	**2013**	**2013**	**2013**	**2 yr**
TWO ROW						
AC Metcalfe	96.0	79.7	52.1	95.4	12.2	13.0
Conrad	78.6	77.6	51.1	92.4	13.3	12.6
Pinnacle	80.9	74.0	51.4	93.7	13.2	12.4
Rawson	76.4	71.5	50.9	94.6	13.1	12.9
Conlon	80.9	70.0	51.3	94.0	12.9	12.8
CDC Copeland	87.4	--	52.2	94.0	13.3	--
SIX ROW						
Innovation	88.2	81.6	51.3	94.8	13.1	13.0
Lacey	88.2	75.4	52.3	96.1	13.2	13.1
Stellar-ND	81.4	72.2	52.6	94.0	11.9	12.6
Celebration	74.0	69.4	51.1	95.7	12.4	12.8
Quest	70.9	69.3	51.0	94.8	13.1	13.3
Tradition	71.4	67.8	52.3	94.0	13.7	13.8
LSD 10%	20.0	--	1.2	2.8	1.3	--

Planted: May 15, 2013 **Harvested:** September 9, 2013
Previous Crop: Spring wheat
* Reported on a 12% moisture basis

Dryland Notill Barley
Crosby, ND

	Yield bu/a		TW lb/bu	Plump %	Protein* %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**2013**	**3 yr**
TWO ROW						
Rawson	107.9	76.0	51.4	97.2	13.6	13.3
Pinnacle	97.0	73.5	51.5	95.0	12.3	12.1
Conrad	96.6	72.9	48.5	93.6	15.4	14.7
AC Metcalfe	96.6	67.3	50.3	95.3	14.2	14.7
Conlon	77.6	56.6	50.7	95.9	14.6	14.9
CDC Copeland	95.0	--	48.4	94.7	13.7	--
SIX ROW						
Stellar-ND	108.1	76.4	50.0	97.8	14.7	14.2
Lacey	98.5	73.6	50.8	97.9	14.9	14.5
Quest	98.4	70.2	49.9	92.6	14.4	14.3
Innovation	92.8	69.2	49.6	95.3	14.7	14.4
Celebration	102.8	69.1	49.4	92.9	15.8	15.6
Tradition	89.7	67.2	49.5	93.3	14.2	14.4
LSD 10%	15.6	--	0.9	2.8	0.7	--

Planted: May 15, 2013 **Harvested:** September 13, 2013
Previous Crop: Spring wheat
* Reported on a 12% moisture basis

Dryland Notill Barley
Beach, ND

	Yield bu/a	TW lb/bu	Plump %	Protein* %
Cultivar	**2013**	**2013**	**2013**	**2013**
TWO ROW				
CDC Copeland	103.6	52.0	94.0	11.5
Conrad	102.1	52.8	94.8	12.4
AC Metcalfe	100.8	52.3	94.2	12.6
Rawson	100.2	51.8	96.0	12.8
Pinnacle	94.9	52.8	97.2	10.8
Conlon	76.7	53.0	98.3	12.8
SIX ROW				
Innovation	103.9	51.2	96.1	12.5
Lacey	101.3	51.6	96.8	12.3
Tradition	100.7	51.1	94.2	12.8
Quest	99.5	51.5	93.9	12.5
Celebration	91.1	51.0	94.3	13.4
Stellar-ND	86.6	50.6	94.5	12.5
LSD 10%	11.7	1.0	4.3	0.5

Planted: May 10, 2013 **Harvested:** September 6,
Previous Crop: Winter wheat
* Reported on a 12% moisture basis

Sprinkler Irrigated Barley
Nesson Valley, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
Pinnacle	61.6	64.8	52.5	9.9	12.0
Quest	80.3	64.0	49.7	11.9	13.9
Conrad	71.1	62.6	52.2	11.4	14.5
Tradition	70.2	61.8	49.4	12.4	13.8
AC Metcalfe	72.5	61.4	54.3	11.5	14.8
Innovation	79.2	61.4	49.3	12.2	14.2
Stellar-ND	56.3	56.5	47.5	12.6	13.9
Conlon	72.9	56.4	51.8	12.5	14.3
Lacey	64.1	55.9	50.3	12.7	14.2
Lilly	61.5	52.1	51.2	10.6	14.0
Celebration	74.6	52.0	49.3	11.9	14.5
Hockett	68.0	--	53.9	11.3	--
Rawson	77.7	--	52.3	12.3	--
LSD 10%	14.4	--	0.8	0.9	--

Planted: May 04, 2013 **Harvested:** August 13, 2013
Previous Crop: Soybean
* Reported on a 12% moisture basis

"Timing has a lot to do with the outcome of a rain dance."

Cowboyway.com

Dryland Oat
Williston, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
AC Pinnacle	102.0	80.0	42.2	13.5	15.6
AC Furlong	89.1	75.3	41.8	12.3	16.1
Souris	83.9	74.8	43.3	14.2	16.2
Leggett	79.7	72.2	42.6	15.3	17.8
Newburg	89.4	70.8	42.7	13.3	16.8
Otana	89.0	70.1	43.9	15.1	17.1
HiFi	91.0	69.7	42.3	14.5	16.6
Beach	76.7	69.4	44.0	15.4	17.1
Stallion	81.6	69.0	43.7	14.8	17.3
Rockford	78.6	68.9	42.9	14.8	17.7
Jury	76.0	68.1	43.5	17.5	18.6
CDC Dancer	89.0	67.7	43.9	13.5	15.9
Killdeer	95.3	66.8	41.5	14.8	16.0
Shelby427	87.2	66.4	44.3	14.6	17.4
CDC Minstrel	89.8	65.4	44.7	13.8	15.3
Morton	80.3	63.5	42.9	15.0	17.1
Stark	75.2	53.8	46.2	16.5	21.6
Hytest	66.6	52.3	43.5	17.2	19.7
Horsepower	84.4	--	44.0	14.8	--
Goliath	72.0	--	41.6	15.7	--
LSD 10%	8.2	--	1.3	--	--

Planted: May 13, 2013 **Harvested:** August 22, 2013
Previous Crop: Soybean

Sprinkler Irrigated Oat
Nesson Valley, ND

	Yield bu/a		TW lb/bu	Protein* %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
Souris	197.3	134.4	40.3	15.9	16.1
Newburg	191.8	133.5	41.0	16.0	16.2
Pinnacle	197.9	124.8	39.1	14.1	14.9
HiFi	170.7	118.7	41.9	16.8	17.1
Rockford	162.3	107.7	41.1	17.3	17.6
CDC Minstrel	221.0	--	38.6	14.8	--
Horsepower	196.2	--	40.2	16.5	--
Goliath	186.7	--	43.7	16.4	--
Jury	182.8	--	41.6	16.5	--
Leggett	173.9	--	42.1	17.3	--
LSD 10%	22.2	--	1.6	0.7	--

Planted: May 03, 2013 **Harvested:** August 30, 2013
Previous Crop: Soybean

Linear irrigation at WREC

"Nature is not necessarily smarter than you, but she does know more than you do."

Texas Bix Bender

OAT VARIETY DESCRIPTIONS

						Resistance To[2]			Quality Factors	
Variety	Origin[1]	Grain Color	Height	Maturity	Lodging	Stem Rust	Crown Rust	Barley Yellow Dwarf	Test Weight	Grain Protein
AC Furlong	AAFC Winnipeg	red	tall	late	MR	S	S	T	high	medium
AC Gwen	Can SeCan	hulless	tall	late	MR	S	S	R	high	m low
AC Kaufman	Can SeCan	yellow	tall	late	MR	S	S	MT	high	m low
AC Pinnacle	Can QAS	white	tall	late	MS	R	R	S	medium	low
AC Ronald	Can SeCan	white	m short	late	R	R	R	T	high	medium
Beach	ND	white	medium	m late	MR	S	MR/MS	MS	medium	m high
Buff	SD	hulless	medium	early	MS	S	MR	MT	v high	high
CDC Dancer	Can Cargill	white	tall	late	MR	S	MS	S	high	medium
CDC Minstrel	Sask.	white	tall	late	MR	S	S	S	m high	medium
CDC Orrin	Can QAS	white	tall	late	MR	S	S	S	medium	m low
CDC Weaver	Canada	yellow	medium	late	MR	S	S	S	medium	medium
Goliath	SD	white	tall	late	MS	S	R	MT	high	medium
HiFi	ND	white	tall	late	MR	MR	R	T	m high	medium
Horsepower	SD	white	medium	medium	R	MR	MR	NA	medium	medium
Hytest	SD	white	tall	early	MS	S	MS	S	v high	high
Jerry	ND	white	tall	medium	MR	S	MS	MT	m high	medium
Jud	ND	ivory	tall	late	MS	R	MS	T	medium	m high
Jury	ND	white	m tall	late	MS	R	R	NA	m high	medium
Killdeer	ND	white	medium	medium	MR	S	MS	MT	m high	medium
Leggett	AAFC Winnipeg	white	tall	late	MR	MR	R	S	medium	medium
Leonard	MN	yellow	tall	late	MR	S	S	T	m low	m low
Maida	ND	yellow	medium	medium	R	R	R	MS	high	m high
Monico	ID/MT	ivory	m tall	m early	MS	NA	NA	NA	m high	medium
Monida	ID/MT	white	m tall	m late	S	S	S	S	m low	m low
Morton	ND	white	tall	late	R	S	S	MT	high	medium
Newburg	ND	white	tall	late	MS	R	R	MT	medium	medium
Otana	MT	white	tall	m late	S	S	S	S	high	medium
Paul	ND	hulless	tall	late	MS	R	MR	T	v high	high
Rockford	ND	white	tall	late	R	S	R	MT	m high	medium
Sesqui	MN	yellow	m tall	late	R	S	S	T	medium	medium
Shelby 427	SD	white	m tall	early	R	MS	S	NA	medium	m high
Souris	ND	white	medium	medium	R	MS	R	MS	high	medium
Stallion	SD	white	tall	late	M	S	MR	NA	high	medium
Stark	ND	hulless	tall	late	MR	R	MS	T	high	m high
Summit	AAFC Winnipeg	white	medium	late	R	S	R	MT	medium	medium
Youngs	ND	white	medium	late	R	S	MS	MT	medium	medium

[1] Refers to developer: AC = Agriculture Canada; SVA = Saskatchewan Value Added; PS = Proven Seed of Canada.
[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.

"This is an exciting time for farmers and ranchers of all types and sizes as agriculture is a bright spot in the American economy. In 2011, agricultural exports hit a record high and producers saw their best incomes in nearly 40 years."

Tom Vilsack

Flax Variety Descriptions

Variety[1]	Origin	PVP[2]	Year Released	Relative Maturity	Seed Color	Plant Height	Wilt	Relative Yield
AC Lightning	Canada	no	2002	late	brown	m tall	R	v good
Carter	ND	yes	2004	mid	yellow	medium	MR	v good
CDC Arras	Canada	no	1999	mid	brown	medium	MR	good
CDC Bethume	Canada	no	1999	m late	brown	m tall	MR	v good
CDC Glas	Canada		2012	m late	brown	m tall	MR	v good
CDC Sanctuary	Canada		2012	mid	brown	m tall	MR	v good
CDC Sorrel	Canada	no	2007	m late	brown	m tall	MR	v good
Hanley	Canada	no	2002	m early	brown	medium	R	v good
Linott	Canada		1966	m early	brown	medium	MS/MR	v good
McGregor	Canada		1980	late	brown	medium	MR	good
Neche	ND	no	1988	mid	brown	medium	R	good
Nekoma	ND	no	2002	late	brown	medium	MR	v good
Omega	ND	no	1989	mid	yellow	medium	MS	good
Pembina	ND	no	1998	mid	brown	medium	MR	good
Prairie Blue	Canada	no	2006	m late	brown	medium	NA	good
Prairie Grande	Canada	no	2008	m early	brown	medium	MR	v good
Prairie Sapphire	Canada			mid	brown	medium	MR	good
Prairie Thunder	Canada	no	2006	medium	brown	short	NA	good
Rahab 94	SD		1994	mid	brown	medium	MR	v good
Shape	Canada		2010	mid	brown	medium	R	good
Webster	SD	no	1998	late	brown	tall	MR	good
York	ND	no	2002	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] PVP = Plant Variety Protection

"Farming is a profession of hope."

Brian Brett

Safflower Variety Descriptions

Cultivar	Origin [1]	PVP [6]	Hull Type [2]	Oil Type [3]	Irrigated Yield [4]	Dryland Yield [4]	TWT [4]	Oil [3]	Maturity	Tolerance [5] Alt.	Tolerance [5] BB
Cardinal	MT/ND	yes	N	high linoleic	v good	v good	high	fair	medium	T	MT
Finch	MT/ND	no	N	high linoleic	good	v good	v high	fair	m early	MS	T
Hybrid 1601	STI	Yes	STP	high oleic	v good	v good	medium	good	m late	MT	MT
Hybrid 9049	STI	Yes	N	high oleic	v good	v good	v high	fair	medium	MT	MT
MonDak	MT/ND	yes	N	high oleic	good	v good	high	fair	m early	T	MT
Montola 2000	MT/ND	yes	N	high oleic	m good	good	medium	good	early	MS	MS
Montola 2001	MT/ND	yes	STP	high oleic	good	fair	medium	good	medium	MT	MT
Montola 2003	MT/ND	yes	N	high oleic	v good	v good	m high	good	m early	MT	MT
Montola 2004	MT/ND	yes	N	high oleic	good	good	m high	good	m early	MS	MT
Morlin	MT/ND	yes	STP	high linoleic	v good	good	medium	good	m late	T	T
Nutrasaff	MT/ND	yes	RED	high linoleic	good	good	medium	high	medium	T	MT

[1] STI = Safflower Technologies International, MT = Montana, ND = North Dakota
[2] STP = striped, N = normal, RED = reduced
[3] Lino - linoleic
[4] Relative ratings of yield, test weight, and oil will vary under conditions of moderate-severe disease infestation
[5] Alt = Alternaria leaf spot disease, BB = bacterial blight, S = susceptible, MS = moderately susceptible, MT = moderately tolerant, T = tolerant
[6] "yes" indicates the variety is protected and the seed may be sold for planting purposes only as a class of certified seed (Title V option)

Sprinkler Irrigated Flax
Nesson Valley, ND

	Yield bu/a		TW lb/bu	Oil %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
Yellow					
Omega	31.2	22.8	53.3	43.1	41.8
Carter	24.3	21.6	53.1	43.6	41.6
Brown					
York	29.9	26.6	53.7	41.9	40.8
Prairie Thunder	30.8	25.8	53.4	43.1	41.7
Nekoma	28.3	23.8	54.0	42.5	41.5
Neche	18.5	16.4	53.5	42.7	41.6
Shape	23.7	--	52.9	44.6	--
LSD 10%	7.8	--	0.4	1.2	--

Planted: May 08, 2013 **Harvested:** October 02, 2013
Previous Crop: Soybean

"Don't put too much faith in weather forecasters – all they're giving you is their best guess."

Tip No. 43 by Texas Bix Bender

Dryland Flax
Williston, ND

	Yield bu/a		TW lb/bu	Oil* %	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
YELLOW SEEDED					
Carter	26.5	17.4	52.3	39.4	39.1
Omega	22.1	15.0	52.5	39.2	39.2
BROWN SEEDED					
CDC Sorrel	32.1	18.7	52.7	40.1	39.9
Neche	27.7	17.1	53.0	38.9	39.3
York	26.9	17.0	52.8	39.0	38.8
Prairie Blue	28.3	16.6	52.5	40.2	39.8
Hanely	25.0	16.5	52.6	38.9	38.7
CDC Arras	27.1	16.4	52.5	39.0	39.2
Rahab 94	26.5	16.4	51.9	39.8	39.6
Linott	26.3	16.3	52.7	38.0	38.5
Webster	24.6	16.3	52.9	40.2	39.9
Nekoma	24.4	16.3	52.6	39.7	39.6
Pembina	24.1	16.3	52.8	39.6	39.7
AC Lightning	26.4	16.2	52.7	39.4	39.6
McGregor	24.8	16.1	52.8	39.4	39.0
Prairie Thunder	23.2	16.1	53.2	38.7	38.7
Prairie Grande	24.2	15.8	52.7	39.3	39.4
CDC Bethume	24.6	15.6	52.7	39.2	39.3
CDC Sanctuary	26.3	--	52.2	39.8	--
CDC Glas	25.4	--	51.5	40.0	--
Prairie Sapphire	23.7	--	51.9	41.4	--
Shape	22.5	--	52.2	41.5	--
TAMF 201	22.9	--	52.4	39.4	--
LSD 10%	4.6	--	0.4	0.3	--

Planted: May 11, 2013 **Harvested:** October 9, 2013
Previous Crop: Spring wheat
*Oil adjusted to 9% moisture

Montana Irrigated Safflower*
Sidney, MT

	Yield bu/a		TW lb/bu	Oil %	
Cultivar	**2012**	**3 yr**	**2012**	**2012**	**3 yr**
Hybrid 1601	2522	2656	37.3	39.9	38.3
Cardinal	2440	2330	42.0	38.9	37.7
MT 2003	2341	2516	39.8	42.1	40.4
Hybrid 9049	2235	2115	40.5	38.5	33.9
MonDak	2112	2204	38.3	39.5	37.4
Morlin	2070	1812	38.0	38.7	39.3
Finch	2026	1973	40.5	39.1	38.5
Mt 2004	1878	1983	37.8	38.5	37.5
Mt 2001	1784	1762	35.5	41.9	39.2
Nutrasaff	1651	1720	37.3	49.6	50.0
Hybrid 200	2965	--	41.0	35.2	--
Hybrid 528	2511	--	34.3	47.0	--
Hybrid 605	2169	--	36.5	44.0	--
LSD 5%	385	--	1.7	2.5	--

Planted : May 8, 2012 **Harvested:** September. 25, 2012
Previous Crop: Spring wheat
***2013 crop destroyed by hail.**

Montana Dryland Fallow Safflower*
Sidney, MT

	Yield lb/a		Test Wt lb/bu		Oil %*	
Cultivar	**2011**	**3 Yr**	**2011**	**3 Yr**	**2011**	**3 Yr**
Hybrid 1601	2165	2238	41.7	41.2	38.9	36.8
Mondak	2236	2026	43.8	43.0	37.0	35.8
Cardinal	2187	2010	44.5	44.1	37.9	36.7
Hybrid 9049	2115	1919	44.3	43.9	33.6	31.7
MT 2003	2030	1790	43.3	42.4	39.5	37.8
MT 2004	2082	1752	42.3	41.0	38.9	37.5
Finch	1736	1712	45.7	45.0	38.8	37.4
Morlin	1795	1666	40.7	39.5	40.3	39.5
MT 2000	1664	1552	41.8	41.0	41.8	39.4
Nutrasaff	1456	1526	40.0	38.2	50.0	48.4
LSD (.05)	296	--	0.5	--	0.7	--

Planted: May 19, 2011 **Harvested:** October 11, 2011
*Oil content reported on an oven dry basis
* **2012** crop yields drastically reduced by grasshoppers and are not reported.
***2013 crop destroyed by hail.**

Dryland Notill Safflower
Williston, ND

Cultivar	Yield lb/a 2013	Yield lb/a 3 yr	TW lb/bu 2013	Oil* % 2013	Oil* % 3 yr
Cardinal	2425	2002	44.1	36.5	35.6
Hybrid 1601	1903	1954	36.4	41.1	37.0
Mondak	2275	1843	41.8	38.1	35.8
MT 2003	2057	1664	41.3	40.2	37.9
Hybrid 9049	1722	1566	42.0	32.2	30.7
Finch	1794	1505	44.7	37.6	36.7
Nutrasaff	1679	1378	37.7	49.1	47.3
Morlin	1364	1318	39.4	39.5	38.2
Hybrid 200	2346	--	42.9	37.0	--
STI 1201	1808	--	37.6	45.1	--
Hybrid 528	1750	--	33.5	44.6	--
LSD 10%	311.8	--	0.6	1.9	--

Planted: June 7, 2013 **Harvested:** October 8, 2013
Previous Crop: Spring wheat
*Oil reported on oven dried basis

Sprinkler Irrigated Safflower
Nesson Valley, ND

Cultivar	Yield --- lb/a --- 2013	Yield --- lb/a --- 3 yr	TW lb/bu 2013	Oil* --- % --- 2013	Oil* --- % --- 3 yr
Hybrid 1601	1573	1757	34.1	36.9	34.8
Montola 2003	1752	1595	39.4	36.4	35.0
Cardinal	1607	1540	41.4	33.0	32.5
MonDak	1711	1361	40.2	32.6	31.9
Hybrid 9049	1629	1334	37.4	29.1	29.1
Finch	1354	1173	39.4	32.9	33.3
NutraSaff	1119	1132	34.5	47.5	45.4
Hybrid 200	1883	--	39.4	32.3	--
Hybrid 528	1262	--	30.7	42.3	--
Morlin	1272	--	36.3	35.9	--
STI 1201	1450	--	33.1	39.0	--
LSD 10%	299	--	0.9	2.2	--

Planted: May 9, 2013 **Harvested:** October 2, 2013
Previous Crop: Soybean
* Oil reported on oven dried basis

"Nobody ever drowned in their own sweat."

Sprinkler Irrigated Canola*
Sidney, MT

Cultivar	Shatter % 2012	TW lb/bu 2012	Oil % 2012	Yield* lb/a 2012
DKL 30-30	18	49.5	40.9	282
DKL 30-42	23	50.0	40.2	376
DKL 51-45	27	49.5	41.8	189
DKL 55-55	27	50.2	43.6	407
DKL 70-07	27	48.7	41.7	342
HYCLASS 955	25	50.7	43.7	404
HYCLASS 947	25	49.2	42.6	281
HYCLASS 988	23	47.7	40.3	332
Gem CL	10	49.0	37.2	109
Invigor L130	30	50.5	38.5	290
Invigor L150	37	50.7	37.9	267
Invigor L120	33	48.7	39.7	390
Mean	24.9	49.7	40.8	310.7
LSD 5%	15.09	1.54	2.43	197

Planted: June 2, 2012 **Harvested:** September 8, 2012
Previous Crop: Sugarbeet
*Poor yield due to 100˚ F temperatures during flowering.
***2013 crop destroyed by hail.**

Dryland Notill Roundup Ready Canola
Williston, ND

Brand	Cultivar	Yield lb/a 2013	Yield lb/a 3 yr	TW lb/bu 2013	Oil* % 2013	Oil* % 3 yr
CG	HyClass 955	1841	1319	49.9	46.4	44.8
DK	DKL55-55	1859	1266	50.2	46.3	44.6
DK	DKL30-42	1922	1255	50.0	45.3	43.3
DK	DKL70-07	2004	1238	49.9	45.1	43.9
BY	6070 RR	1745	1098	48.9	44.3	42.6
DK	DKL72-40	2124	--	50.6	44.9	--
WE	7152	1799	--	50.8	45.6	--
CG	HyClass 969	1787	--	50.2	46.2	--
BY	6044 RR	1769	--	50.5	44.3	--
DK	DKL38-48	1738	--	50.5	44.5	--
WE	7150	1721	--	50.4	45.8	--
SS	Star 402	1703	--	49.3	48.3	--
SS	Star 514	1680	--	49.3	46.3	--
CG	HyClass 930	1656	--	49.7	47.7	--
LSD 10%		307.9	--	0.7	1.4	--

Planted: May 9, 2013 **Harvested:** August 26, 2013
Previous Crop: Spring wheat
*Oil adjusted to 8.5% moisture

DK=DeKalb; BY=Brett Young; CG=Croplan Genetics; SS=Star Specialty Seed; WE=Wilbur Ellis

Dryland Notill Roundup Ready Soybean
Williston, ND

Company	Cultivar	Yield bu/a 2013	TW lb/bu 2013	Oil* % 2013
NG	0057R2	34.1	55.7	17.4
SYN	S00-A7	32.0	54.3	19.1
NuT/G2G	6021	31.9	55.8	19.0
WE/IS	20215 RR2Y	31.3	56.2	17.7
WE/IS	20109 RR2Y	30.2	56.8	17.7
NuT/G2G	7063	29.3	56.6	18.3
NuT/G2G	6043	28.8	57.2	18.3
NG	0096R2	28.8	55.7	18.8
SYN	S04-D3	28.8	55.7	18.5
WE/IS	20090 RR2Y	28.5	56.1	18.7
PRO	PX02	28.2	55.3	17.3
NuT/G2G	6052	28.0	57.5	18.1
SYN	S02-B4	27.5	55.7	18.9
PRO	PX01	27.1	56.3	17.7
NG	NS0080R2	25.9	55.2	18.5
PRO	10-08	25.9	55.8	18.8
PFS	PFS 13R03	24.8	56.5	17.8
WE/IS	20300 RR2Y	24.4	56.3	17.8
PRO	PX09	21.8	55.4	18.1
	LSD 10%	4.1	0.6	0.6

Planted: May 16, 2013 **Harvested:** October 1, 2013
Previous Crop: Spring wheat
*Oil adjusted to 13% moisture
NG=Northstar Genetics; SYN=Syngenta; NuT/G2G=NuTech Seed/G2 Genetics; WE/IS=Wilbur Ellis Co./Integra Seed; PRO=Proseed; PFS=Peterson Farms Seed

Dryland Notill Chickpea
Williston, ND

Cultivar	Yield lb/a 2013	Yield lb/a 3 yr	TW lb/bu 2013
LARGE KABULI			
CDC Frontier	1671	1484	62.4
CDC Luna	1723	1295	61.3
Sawyer	1506	1285	62.3
Dylan	1387	1056	60.3
Sierra	1400	1052	61.2
CDC Orion	2110	--	61.2
CDC Alma	1799	--	61.8
SMALL KABULI			
B-90	1817	1517	61.0
DESI			
CDC Anna	1488	1396	61.0
LSD 10%	293.3	--	0.7

Planted: May 6, 2013 **Harvested:** September 11, 2013
Previous Crop: Spring wheat

"There are only 3 seasons for farmers: before harvest, harvest, and after harvest"

Dryland Notill Conventional Soybean
Williston, ND

Cultivar	Yield bu/a 2013	Yield bu/a 3 yr	TW lb/bu 2013	Oil* % 2013
Sheyenne	26.4	20.2	56.9	19.5
Ashtabula	26.8	18.8	55.3	20.1
ProSoy	25.4	18.6	57.0	18.9
ND1005T	22.6	18.5	57.0	18.7
Traill	21.7	17.2	57.1	19.2
Cavalier	20.4	16.0	57.1	20.1
Proseed LLPX09LL	23.8	--	54.5	20.2
LSD 10%	4.7	--	0.5	0.5

Planted: May 16, 2013 Harvested: October 1, 2013
Previous Crop: Spring wheat
*Oil adjusted to 13% moisture

Dryland Notill Hybrid Corn
Williston, ND

Brand	Cultivar	Maturity	Yield* bu/a 2013	Yield* bu/a 3 yr	TW lb/bu 2013
NuT/G2G	5H-080	83	104.5	80.5	50.2
NuT/G2G	3A-080	80	90.1	75.6	51.1
NuT	5N-183	83	74.6	66.5	51.1
DGS	D23VC35RIB	83	103.7	--	53.2
PRO	PX8R VT2P	85	100.7	--	52.8
PRO	1283 VT2P	83	100.3	--	55.8
NuT/G2G	5Z-781	81	97.2	--	53.1
NuT	5B-7701	77	95.4	--	55.5
NuT/G2G	5H-8002	80	89.9	--	52.5
WE/IS	9301 R	80	89.7	--	55.6
WE/IS	9333 VT2PRO	83	89.0	--	57.0
DGS	D19RR91	79	87.8	--	56.2
SYN	N09V-GT/CB/LL	79	87.4	--	55.9
NuT/G2G	5Z-775	75	84.9	--	52.9
NuT	5B-782	82	84.0	--	51.4
SYN	N08N-GT/CB/LL	77	83.5	--	52.9
PRO	PX82M GT 24-16R	82	82.6	--	52.3
PRO	PX85B VT2P	85	81.6	--	54.3
NuT	5B-7901	79	78.8	--	55.4
SYN	N07H-GT/CB/LL	77	77.6	--	55.0
PRO	1083 3000GT	83	76.1	--	51.4
NuT	3A-7801	78	75.0	--	51.7
WE/IS	9302 VT2PRO	80	73.2	--	55.9
SYN	N12R-3000GT	80	71.2	--	56.4
DGS	D20VC73RIB	80	70.5	--	55.5
SYN	N19L-3110A	85	68.6	--	52.6
LSD 10%			--	9.6 --	0.7

Planted: May 24, 2013 **Harvested:** November 1, 2013
Previous Crop: Spring wheat
*Yields adjusted to 15.5% moisture
NuT/G2G=NuTech Seed/G2 Genetic; NuT=NuTech Seed; DGS=Dyna-Gro Seed; PRO=Proseed; WE/IS=Wilbur Ellis Co./Integra Seed; SYN=Syngenta

Sprinkler Irrigated Corn
Nesson Valley, ND

Cultivar	Brand	Yield Bu/a 2013	Yield Bu/a 3 yr	TW lb/bu 2013	Harvest Moisture %
5H-080	G2	181.6	170.5	50.9	20.9
3A-080	G2	174.6	167.1	52.3	18.4
5N-183	NuTech	166.2	163.8	53.4	20.7
2V550-RIB	REA	148.5	153.4	54.1	19.5
CX13485	Dyna-Gro	192.3	--	54.5	21.7
5H-8002	G2	184.2	--	54.7	20.4
1083 VIP 3220	Proseed	183.5	--	54.5	20.7
D23VC35RIB	Dyna-Gro	180.8	--	54.7	21.8
21N78	PFS	176.6	--	56.2	18.8
3A-7801	NuTech	175.4	--	54.2	19.3
9333 VT2PRO	Integra	175.3	--	57.1	19.1
5Z-781	G2	171.9	--	54.2	20.8
5b-782	NuTech	171.0	--	53.9	20.7
2B404-RIB	REA	169.4	--	55.7	20.0
2B850-RIB	REA	167.8	--	55.5	20.2
1B801-RIB	REA	166.5	--	56.5	18.1
1283 VT2P	Proseed	166.4	--	57.3	18.3
PX 85 VT2P	Proseed	161.9	--	53.3	21.9
5Z-775	G2	160.8	--	55.3	18.3
PX 85 VT2PB	Proseed	159.5	--	57.2	19.6
5b-7701	NuTech	159.4	--	55.6	19.9
PX 82 GTCBLL	Proseed	158.2	--	53.7	20.2
9301 R	Integra	156.6	--	57.9	19.0
9302 VT2PRO	Integra	152.3	--	57.0	20.7
5B-7901	NuTech	149.4	--	57.2	20.9
D20VC73RIB	Dyna-Gro	149.2	--	56.9	20.3
71C80	PFS	148.1	--	56.2	20.3
2B830-RIB	REA	147.2	--	56.0	20.8
LSD 10%		23.8	--	1.9	1.0

Planted: May 23, 2013 **Harvested:** November 13, 2013
Previous Crop: Barley

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

~Edgar Watson Howe

Sprinkler Irrigated Dry Bean*
Sidney, MT

Cultivar	Bean Type	Yield cwt/a 2012	Yield cwt/a 2 yr	SW[1] gm	Harvest Date
Othello	P	36.2	37.0	40.8	Sept. 04
Majesty	DRK	33.8	35.3	68.2	Sept. 14
Stampede	P	32.8	36.1	38.4	Sept. 04
Coyne	GN	32.1	34.6	38.4	Sept. 04
Long's Peak	P	27.7	31.5	35.8	Sept. 04
Rexeter	N	31.5	29.7	18.3	Sept. 14
CA Early	LRK	29.8	27.8	59.5	Sept. 14
T39	B	24.3	28.9	20.7	Sept. 04
Rio Rojo	R	33.5	--	35.1	Sept. 04
Rosetta	PN	30.4	--	32.1	Sept. 04
LSD 5%		4.2	--	3.7	

Planted: May 15, 2012 **Previous Crop:** Sugarbeet
[1]100-seed weight
Type: P=pinto, N=navy, B=black, LRK=light red kidney, GN=great northern, DRK=dark red kidney, PN=pink, R=red
***2013 crop destroyed by hail.**

Dryland Notill Sunflower
Williston, ND

Company	Hybrid	Yield lb/a 2013	TW lb/bu 2013	Oil* % 2013
OIL				
GS	12G20 CL NU	2064	29.1	41.9
NS2	Cobalt II CL HO DM	1959	32.4	43.1
GS	12E12 CL HO DM	1956	31.2	38.0
MS	8N358CLDM NU	1850	30.3	43.8
CP	432E EX NU DM	1847	31.4	38.0
CP	460E EX NU DM	1823	31.3	42.9
GS	12E13 CL HO DM	1801	29.5	39.3
CP	559 CL NU DM	1759	32.8	44.2
NS2	Camaro II CL NU DM	1745	32.7	40.7
NS2	Falcon EX NU	1735	31.4	40.0
NS2	Hornet CL HO DM	1701	30.3	42.4
GS	12E14 CL HO DM	1591	29.1	40.4
GS	11G08 NU	1533	31.0	37.0
CP	548 CL NU DM	1414	31.1	40.4
MS	8N270CLDM NU	1350	30.8	40.0
CONFECTION				
GS	12GCF12	1320	22.8	26.1
GS	12GCF05	1219	25.8	25.4
	LSD 10%	459.6	1.3	2.1

Planted: May 24, 2013 **Harvested:** October 15, 2013
Previous Crop: Spring Wheat
*Oil adjusted to 10% moisture
GS=Genosys; CP=Croplan; NS2=Nuseed/Seeds 2000; MS=Mycogen Seeds
CL=Clearfield; EX=Express
DM=Downy Mildew Resistance; NS=NuSun Hybrid; HO=High-Oleic

Lentil Variety Descriptions

Cultivar	Origin	Seed Color	Relative Maturity	Relative Height	Seed Size	Resistance to	
						Ascochyta	Anthracnose
Avondale	USDA	green	medium	tall	medium	NA	NA
Brewer	USDA	green	early	medium	m large	S	S
CDC Greenland	CDC	green	early	medium	v. large	R	S
CDC Imigreen*	CDC	green	medium	medium	large	R	S
CDC Impala*	CDC	red	early	short	extra small	R	R
CDC Impact	CDC	red	early	short	small	R	MS
CDC Impress*	CDC	green	m late	short	large	R	NA
CDC LeMay	CDC	green	early	short	small	MS	S
CDC Maxim*	CDC	red	m early	medium	small	R	R
CDC Redberry	CDC	red	medium	medium	small	R	R
CDC Red Rider	CDC	red	m early	medium	small	MR	MS
CDC Richlea	CDC	green	m late	medium	medium	S	S
CDC Rosetown	CDC	red	early	short	small	MR	MR
CDC Rouleau	CDC	red	medium	medium	small	MR	MS
CDC Viceroy	CDC	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	brn speck	early	tall	small	NA	S
Pennell	USDA	green	medium	medium	large	NA	S
Riveland	USDA	green	m late	tall	v. large	NA	S

*Clearfield lentil with imidazolinone tolerance

Dryland Fallow Lentil*
Sidney, MT

Cultivar	Type	Yield lb/a 2012	Yield lb/a 3 yr	Test wt lb/bu 2012	100-seed wt -gm- 2012	100-seed wt -gm- 3 yr
Essex	green	729	1571	60.3	4.3	4.4
LC01602300R	green	717	1552	60.2	4.8	5.0
CDC Richlea	green	654	1401	59.3	4.8	5.1
CDC Redberry	red	660	1482	61.7	3.9	4.0
Riveland	green	580	1206	56.7	6.4	7.0
Merrit	green	329	1055	57.7	5.8	6.2
Crimson	red	511	1138	62.5	3.4	3.4
Brewer	green	255	912	59.8	5.2	5.6
Morena	brown	731	--	63.3	3.7	--
CDC Impact	red	596	--	63.3	3.3	--
CDC Greenland	green	582	--	57.2	6.0	--
Eston	green	548	--	62.8	3.2	--
LSD 5%		152	--	0.8	0.2	--

Planted: April 17, 2012 **Harvested:** August 8, 2012

***2013 crop destroyed by hail**

Dryland Notill Lentil
Williston, ND

Cultivar	Yield lb/a 2013	Yield lb/a 3 yr	TW lb/bu 2013
LARGE GREEN			
CDC Greenland	2011	1443	60.4
Pennell	2061	1429	59.3
Riveland	1821	1271	59.9
MEDIUM GREEN			
CDC Richlea	2122	1600	61.9
Avondale	1916	--	62.7
SMALL GREEN			
Essex	2187	1615	63.6
CDC Viceroy	2000	1570	63.8
Eston	1603	--	63.5
SMALL RED			
CDC Red Rider	2169	1671	63.2
CDC Rosetown	2035	1539	63.8
CDC Redberry	2073	1499	63.5
CDC Rouleau	1810	1302	62.8
FRENCH GREEN			
CDC Lemay	1949	1470	63.3
SPANISH BROWN			
Morena	1920	1327	63.7
LSD 10%	473.7	--	0.7

Planted: May 11, 2013 **Harvested:** August 9, 2013

Previous Crop: Spring wheat

Dryland Notill Lentil
Beach, ND

Cultivar	Yield lb/a 2013	TW lb/bu 2013
LARGE GREEN		
CDC Greenland	2369	60.2
Pennell	2344	60.5
Riveland	2177	60.0
MEDIUM GREEN		
CDC Richlea	2896	61.6
SMALL GREEN		
Essex	3321	63.0
CDC Viceroy	3141	64.0
SMALL RED		
CDC Red Rider	3056	63.2
CDC Redberry	2825	63.4
CDC Rosetown	2742	64.3
CDC Rouleau	2733	62.9
FRENCH GREEN		
CDC Lemay	3104	63.9
SPANISH BROWN		
Morena	2758	64.0
LSD 10%	408.9	0.6

Planted: May 10, 2013 **Harvested:** September 6, 2013
Previous Crop: Winter wheat

Dryland Notill Clearfield Lentil
Williston, ND

Cultivar	Yield lb/a 2013	Yield lb/a 3 yr	TW lb/bu 2013
MEDIUM GREEN			
CDC Impress CL	1857	1464	62.0
CDC Imigreen CL	1722	--	62.7
SMALL RED			
CDC Maxim CL	1540	1356	63.1
EXTRA SMALL RED			
CDC Impala CL	1991	1469	64.2
LSD 10%	236.1	--	0.3

Planted: May 9, 2013 **Harvested:** August 19, 2013
Previous Crop: Spring wheat

Dryland Notill Clearfield Lentil
New Town, ND

Cultivar	Yield lb/a 2013	Yield lb/a 3 yr	TW lb/bu 2013
MEDIUM GREEN			
CDC Impress-CL	1831	1498	55.7
CDC Imigreen-CL	1722	--	54.5
SMALL RED			
CDC Maxim-CL	2145	1882	58.7
EXTRA SMALL RED			
CDC Impala-CL	2299	2001	58.7
LSD 10%	468.6	--	1.3

Planted: May 15, 2013 **Harvested:** September 13, 2013
Previous Crop: Spring wheat

Sprinkler Irrigated Lentil
Nesson Valley, ND

Cultivar (Clearfield)	Yield lb/a 2013	Yield lb/a 3 yr	TW lb/bu 2013
CDC Impala-CL	2373	1766	63.1
CDC Maxim-CL	2327	1715	62.7
CDC Impress-CL	2322	1412	60.9
CDC Imigreen-CL	1840	1515	60.2
LSD 10%	713	--	0.7

Cultivar	2013	2 yr	2013
CDC Redberry	2824	2171	62.6
CDC Red Rider	2359	2100	62.1
CDC Rosetown	2293	2033	63.0
CDC Lemay	1915	1918	62.5
CDC Viceroy	1851	1852	62.5
CDC Greenland	1847	1750	59.1
CDC Richlea	1860	1676	59.9
CDC Rouleau	1938	1644	61.7
Essex	1332	1381	59.8
Pennell	1572	1376	58.8
Morena	1357	1370	62.0
Riveland	1498	1218	57.3
LSD 10%	494	--	1.2

Planted: May 7, 2013 **Harvested:** September 6, 2013
Previous Crop: Durum wheat

Dryland Notill Clearfield Lentil
Crosby, ND

Cultivar	Yield lb/a 2013	Yield lb/a 3 yr	TW lb/bu 2013
MEDIUM GREEN			
CDC Impress-CL	1758	1329	58.8
CDC Imigreen-CL	1899	--	57.1
SMALL RED			
CDC Maxim-CL	2605	1732	60.6
EXTRA SMALL RED			
CDC Impala-CL	2427	1478	60.6
LSD 10%	638.4	--	0.8

Planted: May 15, 2013 **Harvested:** September 13, 2013
Previous Crop: Spring wheat

"Good judgment comes from experience, and a lotta that comes from bad judgment."

Cowboyway.com

Field Pea Variety Descriptions

Cultivar	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
Bridger	Legume Logic	SL	SD	medium	medium	medium	NA
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	Legume Logic	SL	SD	medium	Medium	M small	R
Korando	Pulse USA	SL	SD	medium	early	medium	R
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	Legume Logic	SL	SD	medium	late	medium	R
K-2	Pulse USA	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	NA

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

Dryland Fallow Field Pea*
Sidney, MT

Cultivar	Type	Yield lb/a 2012	Yield lb/a 3 yr	100-seed wt gm 2012	100-seed wt gm 3 yr
SW Midas	Yellow	1570	2597	19.3	20.0
Stirling	Green	2039	2595	18.9	20.7
Delta	Yellow	1464	2408	21.6	22.5
Majoret	Green	1335	2302	20.9	22.0
CDC Striker	Green	1121	2245	21.3	23.1
DS Admiral	Yellow	1157	2228	22.1	23.3
K2	Green	1434	2159	20.5	21.6
Cruiser	Green	1201	2079	19.7	20.5
Agassiz	Yellow	1618	--	21.3	--
Montech 4152	Yellow	1585	--	24.0	--
Arcadia	Green	1301	--	19.0	--
Spider	Yellow	1296	--	22.0	--
Bridger	Yellow	1248	--	20.9	--
LSD 5%		395	--	1.5	--

Planted: April 17, 2012 **Harvested:** July 30, 2012

***2013 crop destroyed by hail.**

Dryland Notill Field Peas
Beach, ND

Cultivar	Yield bu/a 2013	TW lb/bu 2013	Protein* % 2013
YELLOW COTYLEDON TYPE			
Agassiz	61.9	62.2	22.0
CDC Meadow	55.6	64.1	20.7
DS Admiral	41.4	63.0	20.3
GREEN COTYLEDON TYPE			
Cruiser	51.9	63.7	22.0
CDC Striker	48.0	62.2	21.0
Majoret	39.9	63.3	22.7
LSD 10%	8.2	0.5	1.3

Planted: May 10, 2013 **Harvested:** September 6, 2013

Previous Crop: Winter wheat

*Protein adjusted to 12% moisture

Dryland Notill Field Pea
Williston, ND

	Yield --- bu/a ---		TW lb/bu	Protein* --- % ---	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
YELLOW COTYLEDON TYPE					
Bridger	56.9	38.9	64.7	26.0	26.6
CDC Treasure	56.9	37.2	65.9	23.3	25.3
SW Midas	60.4	36.3	64.3	23.8	26.1
SW Trapeze	56.4	36.1	63.9	25.3	26.8
DS Admiral	54.6	35.0	64.6	25.3	26.5
CDC Meadow	60.1	35.0	65.9	24.0	25.8
Korando	48.7	34.4	64.6	27.5	27.2
Vegas	52.7	34.3	64.2	27.4	27.1
Agassiz	53.5	34.2	64.0	24.8	26.4
Spider	48.2	34.0	64.6	26.5	26.8
Gunner	46.5	32.2	65.5	24.8	26.5
CM1609	63.1	--	64.3	24.3	--
CM3404	62.9	--	65.0	24.3	--
Supreme	60.7	--	64.4	25.5	--
Torch	60.6	--	64.0	26.8	--
PUSA Exp612	60.6	--	64.7	25.3	--
Mystique	59.6	--	64.2	26.0	--
LN4240	59.2	--	65.3	27.3	--
PUSA 11001	59.1	--	64.5	27.4	--
Salamanca	58.5	--	65.0	26.8	--
Navarro	57.9	--	65.1	26.8	--
Garrison	57.5	--	64.8	26.0	--
PUSA 11002	57.1	--	65.1	27.6	--
E	56.0	--	64.5	25.5	--
LN4228	55.3	--	65.2	27.0	--
Nette	55.0	--	65.5	25.0	--
LN4232	54.7	--	64.0	26.3	--
LN4206 Abarth	54.1	--	64.1	24.5	--
Rainbow	52.3	--	64.7	25.3	--
PUSA 10003	49.0	--	63.8	26.5	--
Gan	42.1	--	64.0	26.4	--
GREEN COTYLEDON TYPE					
SW Arcadia	55.2	38.5	64.5	25.0	26.2
Bluemoon	58.8	37.6	64.3	25.3	26.7
Shamrock	61.8	36.2	64.7	23.8	25.5
CDC Striker	57.3	35.2	64.2	24.8	26.4
Majoret	52.2	32.2	65.0	26.8	27.6
K2	45.9	32.0	64.3	25.3	26.5
Aragorn	46.8	31.4	64.4	26.3	26.8
Cruiser	48.4	30.5	63..6	25.8	26.9
LN1123	60.4	--	65.6	24.0	--
LN1115	58.9	--	65.2	25.5	--
Viper	54.4	--	64.2	26.0	--
Pro 091-7137	54.4	--	64.6	24.5	--
LN1103	54.2	--	64.0	24.8	--
Greenwood	53.9	--	65.1	21.5	--
CDC Raezer	53.3	--	64.5	24.5	--
LSD 10%	5.6	--	0.7	0.7	--

Planted: May 8, 2013 **Harvested:** August 30, 2013
Previous Crop: Spring Wheat
*Protein adjusted to 12% moisture

Sprinkler Irrigated Field Pea
Nesson Valley, ND

	Yield --- bu/a ---		TW lb/bu	Protein* --- % ---	
Cultivar	**2013**	**3 yr**	**2013**	**2013**	**3 yr**
YELLOW COTYLEDON TYPE					
DS Admiral	67.8	54.5	63.9	23.3	24.3
Agassiz	62.3	53.8	63.3	24.1	25.5
CDC Meadow	69.9	--	64.1	22.0	--
GREEN COTYLEDON TYPE					
CDC Striker	69.7	54.6	63.0	21.9	25.1
Cruiser	76.7	51.5	62.9	24.3	25.2
Majoret	75.2	--	63.4	24.7	--
LSD 10%	17.0	--	0.7	0.7	--

Planted: May 08, 2013 **Harvested:** August 15,
Previous Crop: Durum wheat
* Reported on a 12% moisture basis

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

~Ralph Waldo Emerson

☼ **Field peas at WREC** ☼

2013 Betaseed Energy Beet Trial Results
NDSU - Williston Research Extension Center
Nesson Valley (Irrigated)

Cultivar	Sugar Content %	Gross RST lb/ton	Sugar Content % check	Root Yield tons/a	Gross RSA lb/a	Sugar Yield % check
ENR221 (check)	16.6	332.0	100	32.1	10,657	100
ENR224	16.3	326.0	98	32.4	10,562	99
EMR231	15.2	304.0	92	35.5	10,792	101
EAR234	16.9	338.0	102	31.4	10,613	100
ERR223	15.5	310.0	93	35.7	11,067	104
MEAN:	16.1	322.0	--	33.4	10,738	--
CV:	5.6	--	--	10.2	--	--
LSD .05	1.40	--	--	5.10	--	--

Date Planted: May 15, 2013
Date Harvested: September 25, 2013

Sprinkler Irrigated Coded Sugarbeet Variety Trial
Sidney, MT
Approved Varieties for 2014

	Root yield T/a		Sucrose %		Sucrose yield lbs/a		Extractable sucrose lbs/a	
Cultivar	2013	3 yr	2013	3 yr	2013	3 yr	2013	3 yr
Crystal RR081	17.2	30.1	13.50	15.97	4622	9924	4123	9318
Crystal RR052	18.7	30.6	12.34	15.30	4585	9705	3987	9022
BTS 49RR1N	17.2	29.3	12.92	15.58	4427	9432	3959	8883
Crystal RR022NT	17.5	28.6	12.85	15.80	4474	9345	3971	8754
Crystal RR269NT	19.9	--	12.73	--	5057	--	4495	--
SV RR431N	18.4	--	13.04	--	4812	--	4444	--
BTS 42RR8N	19.0	--	12.93	--	4897	--	4370	--
SV 36242N RR	18.8	--	12.22	--	4613	--	4155	--
BTS 42RR65	15.8	--	13.29	--	4176	--	3784	--
HM 9036RR	16.0	--	11.76	--	3772	--	3368	--
LSD 5%	2.1	--	0.85	--	495	--	469	--

Planted: May 9, 2013 **Thinned:** June 24, 2013 **Harvested:** September 24, 2013
Previous Crop: Small Grain. ***Severe hail badly damaged trial on August 10, 2013.**

Flood Irrigated Coded Sugarbeet Variety Trial
East Fairview, ND
Approved Varieties for 2014

	Root yield T/a		Sucrose %		Sucrose yield lbs/a		Extractable sucrose lbs/a	
Cultivar	2013	3 yr	2013	3 yr	2013	3 yr	2013	3 yr
BTS 49RR1N	26.5	30.8	15.73	16.58	8316	10235	7692	9704
Crystal RR022NT	26.5	28.9	16.11	16.80	8525	9715	7908	9176
Crystal RR081	24.6	28.7	15.42	16.61	7575	9587	6879	9045
Crystal RR052	24.4	28.5	15.22	16.39	7429	9393	6688	8829
BTS 42RR8N	28.1	--	16.39	--	9218	--	8532	--
SV 36242N RR	28.1	--	15.68	--	8805	--	8272	--
Crystal RR269NT	27.8	--	15.82	--	8782	--	8103	--
SV RR431N	26.2	--	15.47	--	8096	--	7615	--
BTS 42RR65	24.9	--	16.21	--	8030	--	7505	--
HM 9036RR	22.7	--	13.72	--	6218	--	5772	--
LSD 5%	2.6	--	0.48	--	781	--	727	--

Planted: May 8, 2013 **Thinned:** June 13, 2013 **Harvested:** September 25, 2013
Previous Crop: Small Grain. **Hail damaged trial on August 10, 2013.**

Flood Irrigated Fusarium Screen
Approved Sugarbeet Varieties for 2014

	Disease rating[1]			
Cultivar	**Hurley site**	**Dige site**	**2013 Ave**	**2 yr**
Crystal RR081	3.63	2.88	3.26	2.98
SV 36242N RR	3.69	3.00	3.35	2.83
Crystal RR052	3.00	2.63	2.82	2.63
BTS 42RR65	3.13	2.38	2.76	2.60
Crystal RR022NT	2.88	1.88	2.38	2.22
Crystal RR269NT	2.75	1.44	2.10	2.14
BTS 49RR1N	3.25	1.38	2.32	1.94
BTS 42RR8N	2.56	2.00	2.28	1.89
HM 9036RR	3.31	3.00	3.16	--
SV RR431N	3.13	1.75	2.44	--
LSD 5%	0.80	0.70	--	--
Planted:	May 8, 2013	May 9, 2013		
Disease rating:	September 20, 2013	September 20, 2013		
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.

Sprinkler Irrigated Sugarbeet Seed Treatment Study
Sidney, MT[1]

Seed of the sugarbeet variety BTS39 RR were treated with several different seed treatments in the plant pathology lab in Bozeman. Plots were planted on May 10 with a seed spacing of three inches, or 72,600 seed/ac. Seedling stands were counted on June 19. Quadris at a rate of 9 oz/ac was applied on July 25. Hail storms on August 5 and 6 did some damage, then a defoliating hail storm hit on August 10, which badly damaged the plots. There was good regrowth between the hail storm and harvest. Stands were counted and plots harvested on September 27.

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

Treatments/Products	**Seedling Stand, Plants/ac**	**Harvest Stand, Plants/acre**	**Percent Sucrose**	**Root yld, T/ac**	**Sucrose yld, lb/ac**
Maxim, Apron, Cruiser	47070	39200	12.62	19.3	4867
Maxim, Apron, Cruiser, Vibrance (2.5 gal)	52390	39810	12.53	18.7	4691
Poncho Beta, Allegiance, Thiram	55060	38480	12.72	18.0	4572
Maxim, Poncho Beta, Tachigaren, Penthiopyrad (7 gm/kg)	57350	40540	12.48	18.4	4567
Maxim, Apron, Cruiser, Vibrance (0.5 gal)	42110	36060	12.25	18.5	4513
Maxim, Apron, Cruiser, Dynasty	52150	38360	12.28	17.8	4385
Maxim, Poncho Beta, Tachigaren	58320	39570	12.32	17.7	4347
Maxim, Apron, Cruiser, Vibrance (0.75 gal)	47800	37750	12.44	17.4	4331
Maxim, Apron, Cruiser, Vibrance (7.5 gal)	51790	34240	12.54	17.0	4273
Maxim, Apron, Cruiser, Dynasty, Tachigaren	55180	37750	12.13	17.6	4252
Maxim, Apron, Cruiser, Vibrance (0.25 gal)	47070	36780	12.5	17.0	4237
Maxim, Poncho Beta, Tachigaren, Penthiopyrad (14 gm/kg)	52390	37870	12.40	17.0	4199
Maxim, Apron, Cruiser, Vibrance (5.0 gal)	49490	30980	12.26	14.8	3666
LSD 0.05	5295	5540	0.62	2.6	647

Planted: May 10, 2013 **Harvested:** September 27, 2013

[1] Barry Jacobsen, MSU – Bozeman, Joyce Eckhoff and Charles Flynn, MSU Eastern Agricultural Research Center

Sugarbeet Population and Nitrogen Management Study
Sidney, MT[1]

Joyce Eckhoff and Charles Flynn, MSU Eastern Agricultural Research Center

When Roundup Ready sugarbeets were first grown in the Sidney Sugars district, growers noticed that sucrose contents of Roundup Ready sugarbeet were lower than sucrose of conventional sugarbeet. This was attributed to genetics, since Roundup Ready sugarbeet were newly developed, and are diploids, while conventional sugarbeet are triploids. However, new varieties have since been developed with higher sucrose, but sucrose contents in the Sidney Sugars district are still disappointing, especially when compared with sucrose content achieved by growers in other districts.

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

This was the first year of a sugarbeet study to evaluate several plant populations with different nitrogen rates. The variety ACH RR052 was planted in 2 inch, 3 inch, 4 inch, 5 inch, and 6 inch seed spacing on May 10. The numbers of plants per plot were counted on June 18. Quadris at a rate of 9 oz./ac was applied on July 25. Hail storms on August 5 and 6 did some damage, then a defoliating hail storm hit on August 10, which badly damaged the plots. There was good regrowth between the hail storm and harvest. Stands were counted and plots harvested on September 23.

Top dressed nitrogen had little effect on yield or sucrose. The narrowest seed spacing resulted in highest percent sucrose. Highest root yield was achieved at the four-inch seed spacing. Two rates of pre-plant N were applied on October 17 for the 2014 growing season. The same five seeding rates will be tested with and without top-dressed N in 2014.

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

Seed Spacing	Top Dressed N	Seedling Stand, Plants/ac	Harvest Stand, Plants/ac	Percent Sucrose	Root Yield, T/ac	Sucrose Yield, lb/ac	Extractable Sucrose, lb/ac
2 inch		101200	49970	13.49	15.1	4071	4024
3 inch		68370	45560	13.36	16.2	4318	4265
4 inch		51300	39570	13.07	18.2	4746	4683
5 inch		46220	36720	12.99	17.1	4451	4394
6 inch		36480	29340	13.33	15.6	4140	4088
LSD 0.05		6772	2959	0.45	2.0	503	496
	0	61030	40830	13.17	17.0	4460	4404
	30	60380	39640	13.33	15.9	4230	4177
	LSD 0.05	ns	ns	ns	ns	ns	ns

Phosphorus Fertility in Sugarbeet

Bart Stevens, USDA-ARS, and Joyce Eckhoff, MSU-Eastern Agricultural Research Center

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 Easter 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 3 inch x 3 inch band at 0, 25, 50, 100, and 150 lb P_2O_5/acre. 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 2 times beginning when seedlings were first emerging. Whole plant samples were collected at two different dates and separated into tops and roots to be dried and weighed. Yield (fresh root weight) and quality (root sucrose content and impurities) were determined from samples harvested in late September.

Results: Weather severely affected by weather conditions in 2013. Dry weather during germination slowed emergence but timely spring rains ultimately produced good stands of about 21 plants per 10 feet of row (Table 1). Stand was the same regardless of fertilizer P source, placement or application rate. Seed row application (popup) reduced stand by 11%.

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

Fertilizer Treatment	Fertilizer Placement	May 28, 2013	June 17, 2013
		Plants per 10 ft of row	
Dry 11-52-0	Broadcast	15.5 a	21.2 a
Dry 11-52-0 + Avail	Broadcast	15.0 a	20.7 a
Liquid 10-34-0	Banded	14.7 a	20.2 a
Liquid 10-34-0 + Avail	Banded	15.5 a	22.0 a
Liquid 10-34-0 + Avail + popup	Banded	13.3 b	18.7 b

A series of severe hail storms in late July defoliated sugarbeet and caused an estimated 50% reduction in sucrose yield. Both root yield and sucrose content were dramatically reduced compared to normal values. Fertilizer P source (dry vs. liquid) had no significant effect on yield components except that SLM was slightly higher with 10-34-0 than with 11-52-0 (Table 2).

Table 2. 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	Sucrose Yield
Dry 11-52-0	Broadcast	14.68 a	1.18 b	18.7 a	5017 a
Liquid 10-34-0	Banded	14.51 a	1.29 a	19.2 a	5030 a

Sugarbeet sucrose yield responded to P application with a notable increase from 0 to 120 lb per acre application rates (Figs 1 and 2). Popup fertilizer significantly increased sucrose yield at all 10-34-0 application rates (Fig 1) despite reducing plant population (Table 1). This suggests that popup may be beneficial when P is banded. The popup was not applied with broadcast 11-52-0. Avail P availability enhancer had no effect when applied with 11-52-0 but did increase sucrose yield when applied with 10-34-0 at the lower P application rates of 30 and 60 lbs per acre Fig 2).

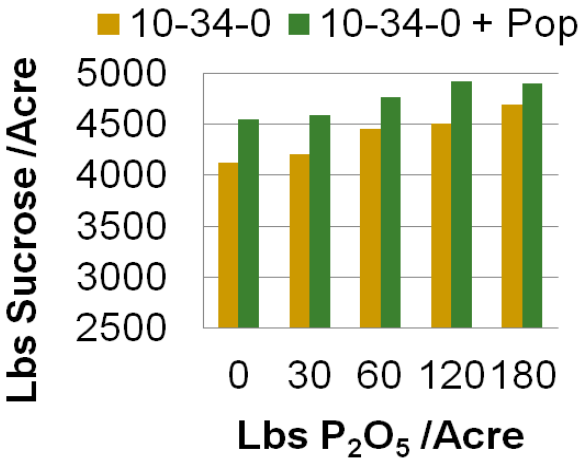


Figure 1. Effect of popup fertilizer applied at 11 lbs per acre together with 10-34-0 applied at five application rates.

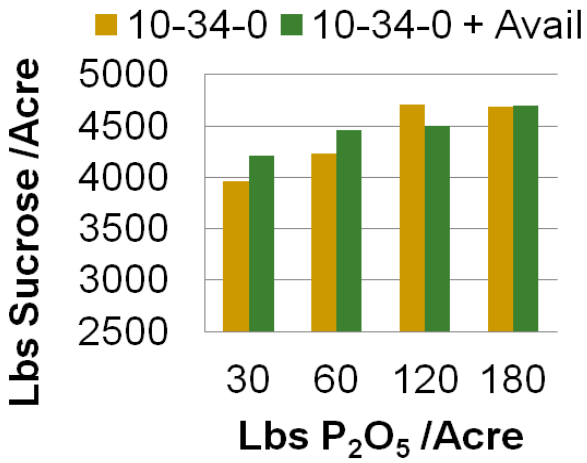


Figure 2. Effect of Avail P availability enhancer together with 10-34-0 applied at four application rates.

New Superintendent for MSU-Eastern Agricultural Research Center

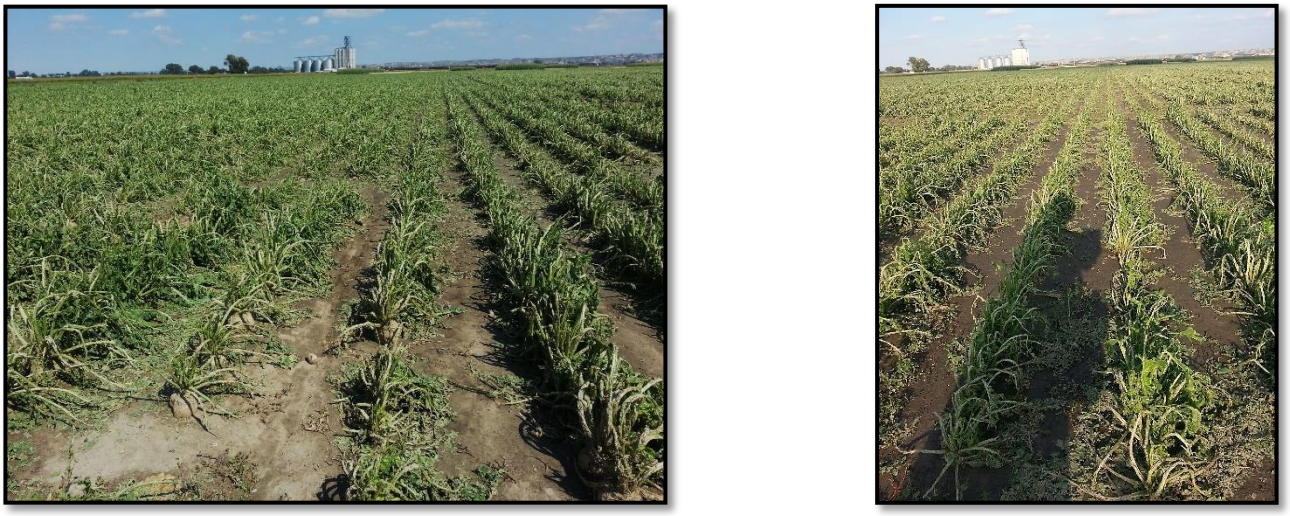
Dr. J.H.M. Schneider has recently been appointed as Associate Professor of Plant Pathology and Superintendent of Eastern Ag Research Center in Sidney, Montana. Hans originally comes from the Netherlands and joined MSU-EARC in August 2013. He received his MSc (1989) and Ph.D (1989) from the Wageningen University. Hans has had several research positions in the Netherlands: the Department of Plant Protection Service of the Ministry of Agriculture; the Institute for Plant Protection Research; the Institute of Sugarbeet Research (IRS); and at Monsanto Vegetable Seeds. At IRS, Hans worked for 13 years on disease management programs of sugarbeet diseases and pests. He's travelled frequently to different sugarbeet growing states in the US, amongst which Montana was one.

Dr. Schneider's main task is to develop an integrated disease management program for crops important in the area such as sugarbeet, pulse crops, wheat and other crops. To support the research program, a plant pathology laboratory is in the process of being established. The laboratory can also be consulted as a plant disease diagnostic lab for the sugarbeet industry. Hans first experience with the sugarbeet crop at the EARC was the damage hail caused after three hail storms in August.

Hailed Sugarbeet Crop and Some Side Effects

Johannes H.M. Schneider, MSU-Eastern Ag Research Center

Early August crops were seriously damaged by hail storms that hit the crop three times in the first ten days of August. The sugarbeet plants were 85-95% defoliated. The canopy recovered well, but at the expense of sugar content. Damage by hail does reduce sugar content, but not the purity as old research (1966) by Dr. Soine, Professor of Soils at the University of Minnesota, North West Experiment Station at Crookston, MN, revealed.



Sugarbeet field trials damaged by hail after the third hail storm early August at EARC.

Late drilling and hail damage resulted in poor root growth. At harvest, a lot a small sugar beets didn't pass the harvest system and remained as crop debris on the land. This is undesired in terms of yield loss. In terms of cost efficient sugar beet growing, one should try to harvest what has been drilled. The crop debris also provides an excellent inoculum source for soil-borne pathogens for the years to come.

Sugarbeet crop debris left in fields after harvest.

Sugar beet cyst nematodes

Sugar beet cyst nematodes (*Heterodera schachtii*) (bcn) are known to occur in Eastern Montana. However, the distribution (number of fields infested with bcn) and the population density are not very well known. This also holds for the fields belonging to EARC. Therefore, it was decided to conduct a small survey to the potential infestation of EARC fields with sugar beet cyst nematodes. EARC staff sampled the fields according to a recommended and standard procedure for nematode sampling. The soil samples were analyzed by the nematode diagnostic laboratory at the University of Idaho. Sugarbeet cyst nematodes indeed were found in soil samples taken from EARC fields (Table…1).

Table 1. Population density of sugar beet cyst nematodes found in 500 ml soil sampled from fields at EARC in fall 2013.

		precrops		cysts		e+l /	Dutch terminology
Site	2013	2012	2011	viable	empty	500 ml soil	
1A-1	SB	SAF	SW	12	25	972	light
1A-2	SB	SAF	SW	9	98	669	light
1B-1	SW	SB	SAF	7	27	1376	light
1B-2	SW	SB	SAF	13	65	1040	light
2-1	SB	SW	SB	1	11	75	very light
2-2	SB	SW	SB	1	79	222	very light
4A-1	SB	G	SAF	31	114	3503	moderately to severe
4A-2	SB	G	SAF	15	11	2145	moderately
7-1	SG	SAF	SB		to be resampled		
7-2	SG	SAF	SB	1	12	201	very light
7-3	SG	MC	SB	7	108	469	very light
7-4	SG	MC	SB	2	107	403	very light
8-1	SW	SB	SW	0	3	0	not detectable
8-2	SW	SB	SW	1	3	194	very light

Precrops: SB: sugar beet; SW: spring wheat; SG: small grains; SAF: safflower; G: grains; MC: miscellaneous crops. Cysts, eggs and larvae (e+l) are expressed as the number per 500 ml of soil.

Since the fields were not sampled for over 20 years, nothing is known about initial population densities previous to the crops grown in 2013. Therefore, we assume the initial population as an average of the fields grown with crops other than sugar beets in 2013, being 660 e+l / 500 ml soil. The final population of bcn, after sugarbeet, have been grown varied from 75 to 3505 e+l / 500 ml of soil. Based on experience of other research such a multiplication rate is to be expected after growing a sugarbeet crop. These figures also explain why sugarbeet varieties with a high tolerance to sugarbeet cyst nematodes perform very well in the variety trials conducted on the EARC fields. These results also suggest that growing a bcn tolerant variety is already profitable at low initial bcn population densities. These results also call for 1) a study of the influence of individual bcn nematode tolerant varieties in comparison with non-tolerant varieties on the population dynamics of beet cyst nematodes in field trials; 2) a survey among sugarbeet growing farmers to the infestation levels of beet cyst nematodes. These results may influence the variety choice in a specific situation and lead to a more profitable crop.

Yield reduction by beet cyst nematodes may not always be that clear in Eastern Montana since it is an irrigated crop. Under non-irrigated growing conditions, the presence of bcn can be visible as wilting patches in the field. Beet cyst nematodes do reduce root yield, but not sucrose percentage. See pictures below for the effect of sugar beet growth in a soil infested with sugar beet nematodes.

Left picture shows the root development of a sugarbeet grown in a healthy soil (the roots go 6 ft deep into the soil) in comparison with a sugarbeet grown in an infested soil (split roots and the roots grown no more than 3 ft deep). The picture on the right shows sugar beet roots with sugarbeet cyst nematodes, visible as white 'pin heads' on the roots. Source: KNIVB/IRBAB; www.irs.nl.

Crop Performance Comparisons on Dryland – Williston, ND

Chet Hill, NDSU-Williston Research Extension Center

Crop		Variety	2013 Selling Price $/bu	3 Yr Ave Yield bu /ac	Gross Return $/ac	$ Gr. Ret/a + or - Reeder
HRS Wheat		Elgin	6.20	35.2	$218	+$10
		Barlow	6.20	34.3	$212	+$4
		Reeder	6.20	33.5	$208	$0
HRW Wheat		Jerry	5.85	57.1	$334	+$126
Durum Wheat		Divide	7.00	35.5	$249	+$41
		Joppa	7.00	39.6	$277	+$69
Barley	(Feed)	Rawson	3.50	71.7	$251	+$43
Barley	(Malting)	Celebration	5.75	67.9	$390	+$182
	(Malting)	Pinnacle	5.75	70.3	$404	+$186
Oats		Killdeer	3.00	87.2	$262	+$54
Corn	(Grain)	Average*	4.25	74.2	$315	+$107
Flax	(Brown)	Neche	13.50	16.3	$220	+$12
Flax	(Yellow –Food)	Carter	14.00	17.9	$251	+$43
Soybeans		Sheyenne	12.55	22.4	$281	+$73
Field Peas	(Green)	Cruiser	12.00	33.8	$406	+$198
Field Peas	(Yellow)	Mozart	8.00	35.8	$286	+$78
			$/CWT	lbs/ac		
Camelina		Blaine Creek	14.00	986	$138	-$70
Brown Mustard		Average*	35.00	1046	$366	+$158
Yellow Mustard		Tilney	38.00	1102	$419	+$211
Canola		Hyola 357 Mag	26.00	1183	$308	+$100
Safflower		Average*	28.00	1930	$540	+$332
Sunflower (Oil)		Average*	20.00	1600	$320	+$112
Buckwheat		Manor	26.00	1249	$325	+$117
Lentils	(Sm. Green)	CDC Viceroy	18.00	1299	$234	+$26
Lentils	(Med. Green)	AC Richlea	17.50	1342	$235	+$27
Lentils	(Lg. Green)	Riveland	19.00	1059	$201	-$7
Lentils	(Red)	Rouleau	19.50	1048	$204	-$4
Chickpeas	(Desi)	CDC Anna	22.00	1011	$222	+$14
Chickpeas	(Kabuli)	CDC Frontier	28.00	1251	$350	+$142
Chickpeas	(Small Kabuli)	B-90	30.00	1154	$346	+$138
Pinto Beans		Maverick	36.00	425	$153	-$55
Navy Beans		Norstar	36.00	395	$142	-$66

*Average of several varieties within the crop

"My Grandfather used to say once in your life you need a doctor, a lawyer, a policeman, and a preacher, but every day, three times a day, you need a FARMER."

Brenda Schoepp

Development of Durum Varieties for the MonDak Region

Joyce Eckhoff, MSU Eastern Agricultural Research Center

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 13 solid and semi-solid stemmed lines in advanced yield trials in 2013. However, severe hail on August 10 damaged the plots so that yield data could not be obtained. Stem solidness is rated on a scale of 5-25, with 5 being completely hollow and 25 being completely solid. All but one of the experimental lines had stem solidness ratings of 20 or greater. Mountrail had a stem-solidness rating of 12.2, and Alzada had a stem-solidness rating of 12.7. More solid-stemmed lines are in development, with 60 lines with stem solidness ratings of 20 or greater under increase in the greenhouse this winter.

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.

Several dozen lines from the CIMMYT (International Maize and Wheat Improvement Center) program were evaluated for Cd accumulation and quality. A total of 11 lines with low Cd accumulation and good quality were identified. Emasculated 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, but the plots were hailed on August 10 and no yield data was obtained. We are currently increasing 54 lines that are homozygous for the low-Cd gene in the greenhouse

"Using markers to label what you've planted will help you to keep it all straight but won't lead to any fun surprises."

Tip No. 42 by Texas Bix Bender

IRRIGATION RESEARCH AT NESSON VALLEY 2013

Tyler Tjelde, NDSU Williston Research Extension Center

AGRICULTURE, it's a pretty big word these days. How are we going to meet the food demands of a growing world population? It seems like a popular question, one that I hear quite often. The current industry, agriculture, has been in a very favorable state of growth over the past couple years, especially in our region. Commodity pricing has been very favorable and above all, we have had favorable conditions, especially in terms of above average precipitation. Of course there have been the few unfortunate disasters (flooding, drought, severe weather) but these have been on a relatively small scale compared to other parts of the country. A true test to the state of agriculture is the value of land. It doesn't reach these levels without seeing greater returns. Agriculture is exciting right now with all the opportunity it provides and hopefully this trend continues into the future.

The 2013 field day tried an approach towards new and exciting. Attendees were provided information from NDSU Ag Economist, Frayne Olson, on the economics of corn and soybean. David Spickler, Blue Flint Ethanol discussed options producers have with corn and Blue Flint Ethanol. David Schmidt, NRCS, provided a demonstration with a rainfall simulator on the effects of infiltration and different tillage/cropping systems. We hope that those attending found these topics interesting, informative and an opportunity to learn something new and not just a free burger. However I am concerned that field days are becoming a thing of the past as trends have shown a declining number of attendees each year. Is it because information is available at our fingertips and the newer generation farmers prefer this? I'm not sure, but our goal is to make field days interesting, informative and hands on, so we look forward to seeing you at our irrigation research tour at Nesson Valley on **July 11th, 2014**.

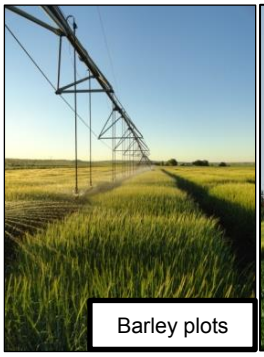
Interesting tidbits from Nesson Valley in 2013 …Sclerotinia or white mold had a major impact on variety trial plots (dry bean, soybean, sunflower, chickpea and lentil) this season. This has created disease research for the future. Fungicide applications on small grains at early heading are becoming very important for grain yield and quality. Monitoring soil nitrates throughout the season is very important especially when intensive rainfall events occur. Grasshoppers reached a damaging threshold this year to the point that the only option was aerially spraying the entire research site.

Each year brings new challenges. One of the biggest challenges for the upcoming year will be replacing someone that has been working by my side for the past six years. Cameron has decided to commit to farming full time and I want to thank him for his help over that six year period and wish him the best in his new endeavor.

The continued vision at the Nesson Valley site is to further advance irrigation practices, improve crop production within an irrigated system and develop alternative cropping systems to improve water, nutrient and pest management. As always, I encourage anyone with ideas/questions to contact me at the WREC.


Plot Planter


2013 Nesson Valley Field Day


Barley plots


Tillage study

Evaluating Fertilizer Timing in Durum and Barley (Nesson Valley 2013).

Tyler Tjelde, NDSU Williston Research Extension Center

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 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 (0-12", 12-24", 24-36") 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 110 bushels and planting populations were 1.5 million and 1.25 million PLS per acre respectively. The trial was planted on May 4 2013. 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 13 and durum August 23, 2013 using a small plot combine.

2013 Durum Fertilizer Timing

Treatment	Soil Test (0-36") NO_3-N (lb/A)	Fertilizer* lbs N/acre/App.	Yield bu/A	2-year Yield avg bu/A	Test Wt lb/bu	Protein %	2-year Protein avg. %
Check (no fertilizer applied)	38	0	38.1	38.4	63.1	11.5	11.3
ALL PRE	35	165	69.0	60.3	63.0	14.1	15.1
PRE/POST1	37	82	66.7	58.2	62.8	13.9	15.3
PRE/POST1/POST2	41	53	69.8	58.5	62.9	14.3	15.4
PRE/POST1/POST2/POST3	34	42	66.9	57.2	63.1	13.4	14.4
POST1/POST2/POST3	44	52	56.7	50.8	62.8	14.8	15.8
Mean			61.2	53.9	63.0	13.7	14.6
CV %			12.5		0.5	4.0	
LSD (0.5)			11.6		ns	0.8	

2013 Barley Fertilizer Timing

Treatment	Soil Test (0-36") NO_3-N (lb/A)	Fertilizer* lbs N/acre/App.	Yield bu/A	2-year Yield avg bu/A	Test Wt lb/bu	Protein %	2-year Protein avg. %
Check (no fertilizer applied)	37	0	38.2	50.7	49.9	13.1	12.0
ALL PRE	32	100	78.5	76.3	49.8	14.1	13.3
PRE/POST1	32	50	79.4	80.4	50.0	14.0	13.8
PRE/POST1/POST2	31	34	71.3	74.8	49.1	13.9	13.7
PRE/POST1/POST2/POST3	36	24	57.1	69.9	50.0	14.0	13.4
POST1/POST2/POST3	37	31	50.4	61.0	50.2	13.9	13.9
Mean	--	--	62.5	68.9	49.8	13.8	13.4
CV %	--	--	13.8	--	1.6	5.4	--
LSD (0.05)	--	--	13.0	--	ns	ns	--

*1st application ALL PRE - May 9 (5 day after planting)
2nd application POST1 - June 13 (5 leaf T2 stage)
3rd application POST2 - June 23 (flag leaf stage)
4th application POST3 - July 3 (heading stage)

This project will be conducted one more year (2014) to have three years data assessing the effects of fertilizer timing on small grain production. A site will be selected that has similar soil NO_3-N. Irrigation and N needs will be monitored closely to maintain efficient use of fertilizer crop use.

WREC Irrigation Scientist, Tyler Tjelde, speaking at the Nesson Valley Irrigated Field Day 2013.

☼ Barley field at WREC ☼

"Despite our artistic pretensions, sophistication and accomplishments, we still owe our existence to a six inch layer of topsoil… and the fact that it rains."

Unknown

Comparing Tillage Systems (Conventional, Minimum, No-till) With Overhead Irrigation Using a 3-Year Crop Rotation of Corn, Soybean, and Barley (Nesson Valley 2013).

Tyler Tjelde and James Staricka, NDSU Williston Research Extension Center

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 consisted of multiple passes (6 total) with a disc, ripper, and mulcher resulting in <30 % residue left. Minimum tillage 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 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, and stand counts were measured after planting/crop emergence. Soil water content, shown in Figure 1, was measured in all three crops and tillage systems to identify crop water needs. Representative areas within the plots were sampled with a plot combine for data collection. Grain yield, protein, and test weight were measured after harvest. All crop and data analysis was done at the WREC.

No-till corn

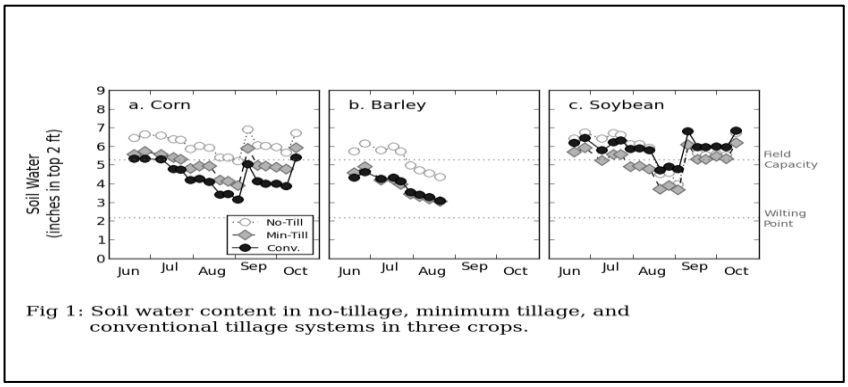
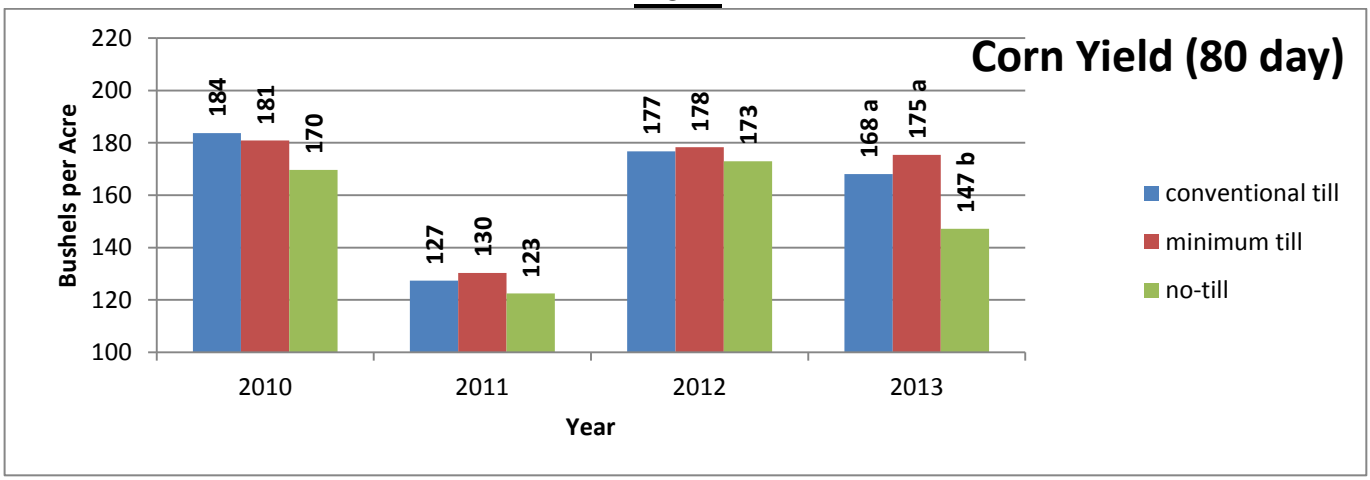
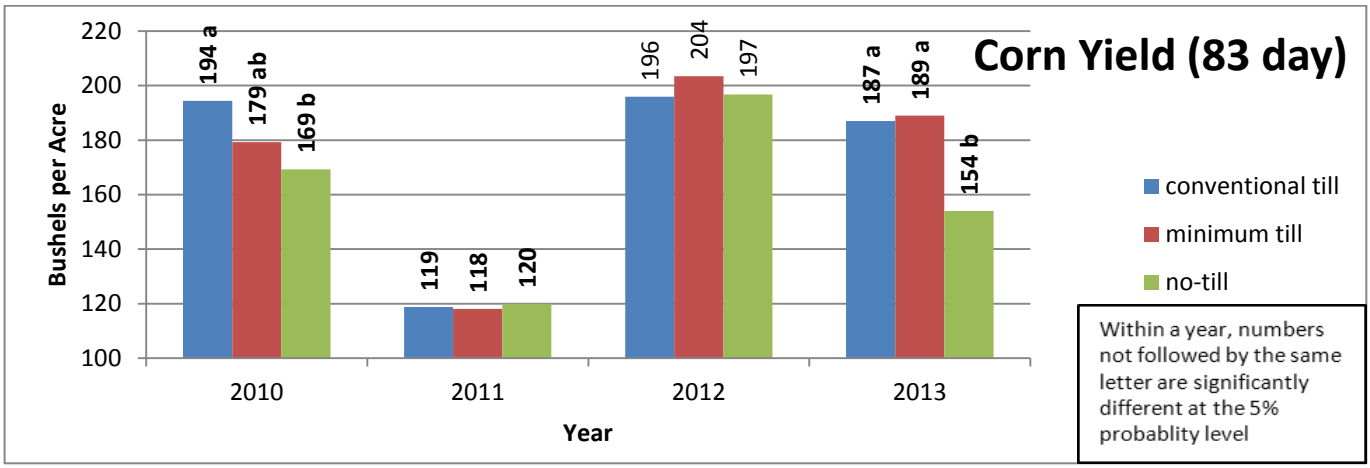


Fig 1: Soil water content in no-tillage, minimum tillage, and conventional tillage systems in three crops.

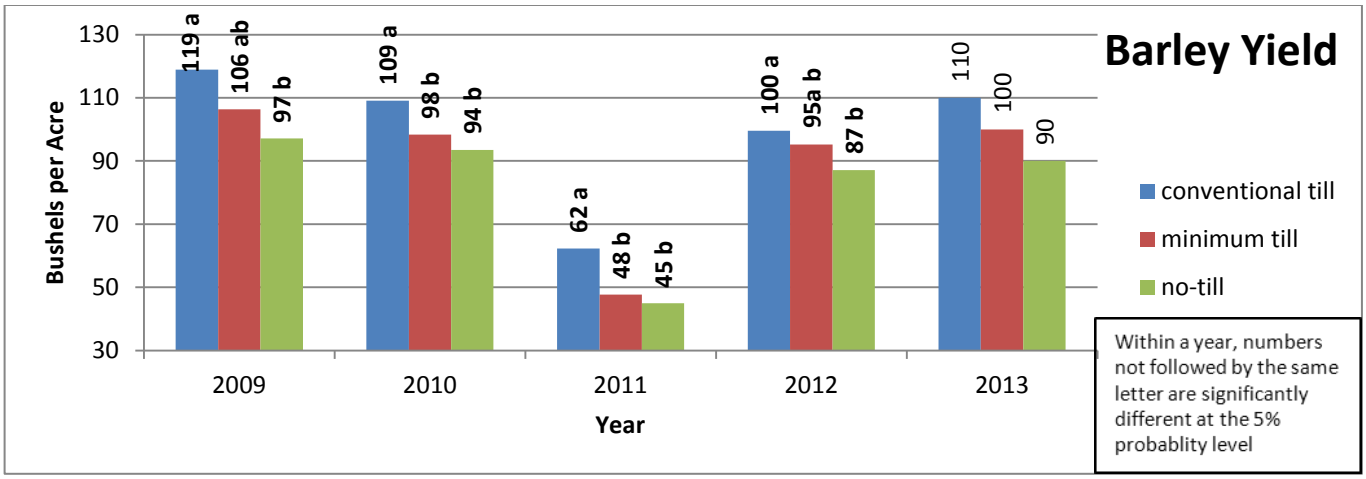
Results

Corn

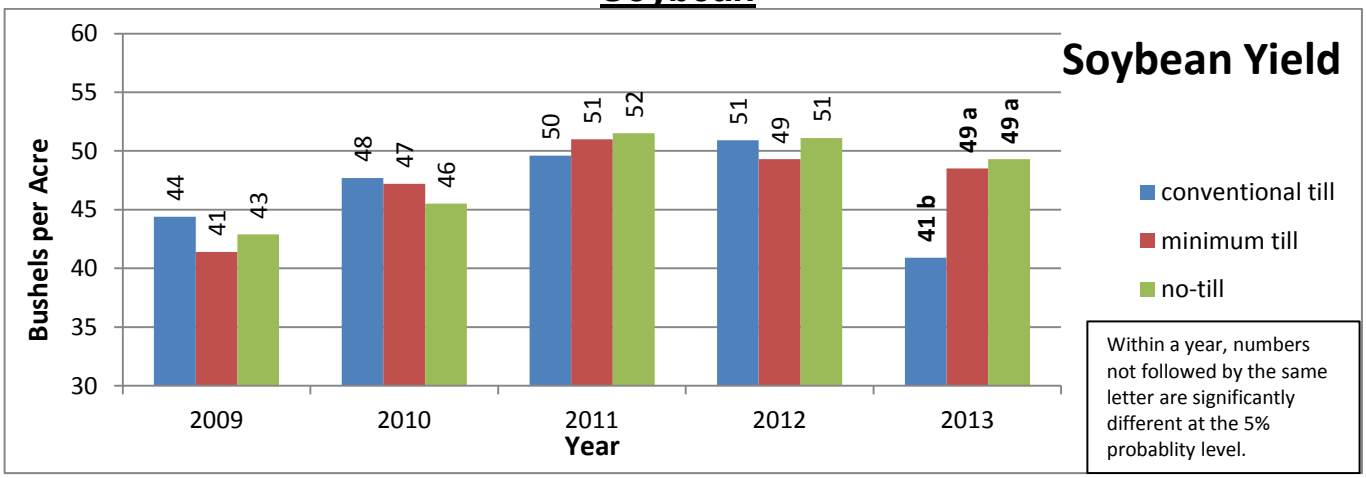


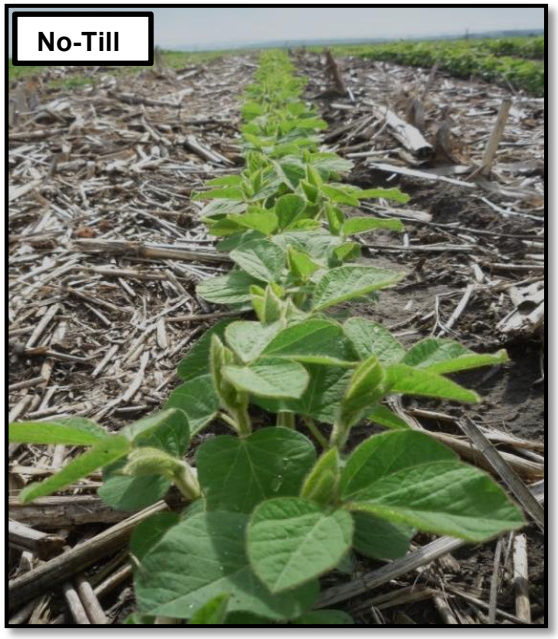


Barley


Barley Yield
Bushels per Acre
130
110
90
70
50
30
119 a
106 ab
97 b
109 a
98 b
94 b
62 a
48 b
45 b
100 a
95a b
87 b
110
100
90
2009
2010
2011
2012
2013
Year
conventional till
minimum till
no-till
Within a year, numbers not followed by the same letter are significantly different at the 5% probablity level

Soybean


Soybean Yield
Bushels per Acre
60
55
50
45
40
35
30
44
41
43
48
47
46
50
51
52
51
49
51
41 b
49 a
49 a
2009
2010
2011
2012
2013
Year
conventional till
minimum till
no-till
Within a year, numbers not followed by the same letter are significantly different at the 5% probablity level.


No-Till


Conventional Till

Quantifying Water Use (Water Use Efficiency) in Irrigated Barley, Wheat, Potato, Sugarbeet Production on Lihen Fine Sandy Loam Soils at Nesson Valley - 2013.

James Staricka and Tyler Tjelde, NDSU Williston Research Extension Center

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 amounts of irrigation to be applied for the 100% treatment rate were determined using 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 October 1 was above normal but July and August were below normal and September rainfall was above normal (Table 1). The growing season temperatures were below normal for the 2013 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 usage. Yield and quality analysis for the all crops was done by the WREC except when mentioned otherwise.

Table 1: Rainfall at Nesson Valley.

	Rainfall	
Month	Normal	2013
	------ *inches* ------	
May	2.23	2.87
June	3.08	3.65
July	2.73	2.09
August	1.64	1.04
September	1.22	4.23
Total	10.90	13.88

Results

Sugarbeet

The sugarbeet trial was planted May 15. The emergence date was May 21. There were 17 irrigations between planting and harvest, the first on June 28 and the final on September 6. The amount of water applied to sugarbeet for the four irrigation treatments (100%, 67%, 33% and 0%) was 8.7, 6.4, 4.4, and 0.0 inches, respectively according to the rain gauges located within each plot. Rainfall recorded from planting through harvest was 13.9 inches, so that the total water received by the four treatments was 22.9, 20.3, 18.3, and 13.9 inches, respectively.

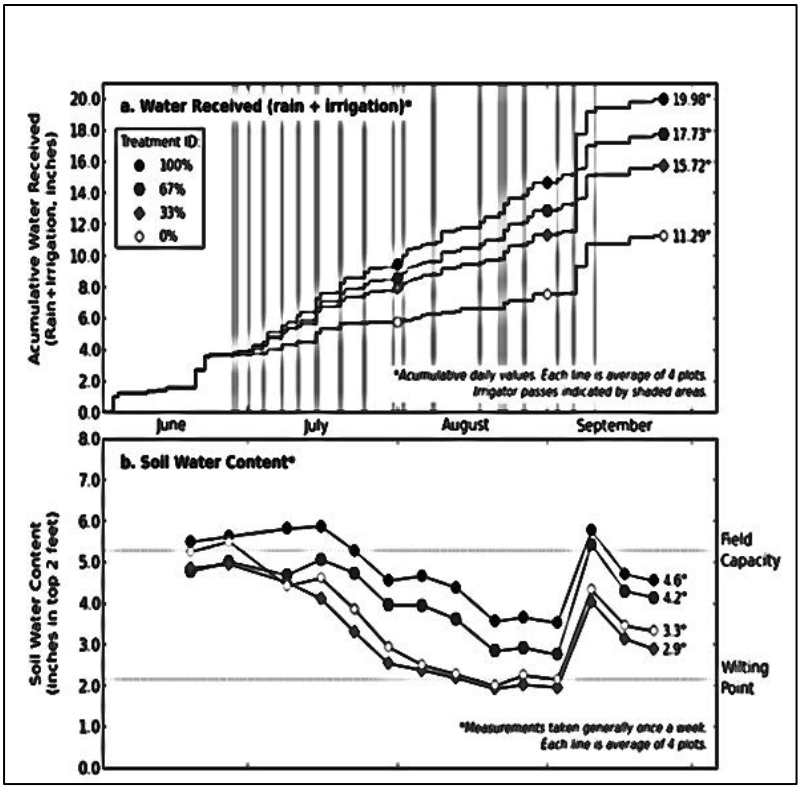


Figure 1: Rainfall, irrigation, and soil water content in sugarbeet.

The rainfall and irrigation amounts measured by the recording rain gauges (Fig. 1a) were lower than what was expected. This discrepancy was likely caused by the tendency of tipping-bucket style rain gauges to under-measure during periods of intense rainfall or irrigation.

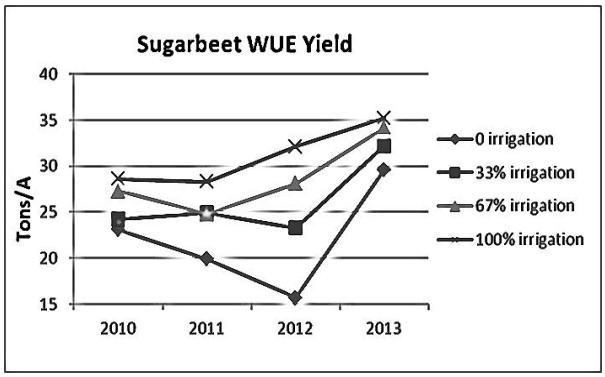
The soil was slightly wetter than field capacity for all four treatments on June 25 (Fig 1b). Irrigation started on the June 28 because of the increasing daily water usage, even though soil water content was still at field capacity. This was to maintain adequate soil water content because once depletion begins it is hard to increase.

By August 10, the soil in the 0% and 33% treatments had dried to wilting point and lost only a minimal amount of water until September 7 when the plots received 3.44 inches of rain in a two-day period. 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.

Sugarbeet were harvested on 24 September. A sample of sugarbeet from ten 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. The yield samples were analyzed at the Sidney Sugars laboratory and tons per acre and sugar and nitrate percentages were determined. No statistical significant difference existed among the treatments (Table 2).

Table 2. Sugarbeet performance.

Irrigation	Population	Yield	Sugar
	beets/10ft	*ton/a*	*%*
0%	18	29.6	15.8
33%	17	32.2	16.0
67%	19	34.2	16.3
100%	16	35.2	16.1
CV (%)	16.8	14.1	2.5
LSD 5%	ns	ns	ns



Potato

The Potato WUE trial was planted May 2. The emergence date was June 4. There were 13 irrigations between planting and harvest, the first on June 28 and the final on August 23. The amount of water applied for the four the irrigation treatments (100%, 67%, 33% and 0%) was 6.9, 4.6, 2.3, and 0.0 inches, respectively. Rainfall from planting though harvest was 9.7 inches, so that the total water received by the four treatments was 16.6, 14.3, 12.0, and 9.7 inches, respectively.

Irrigation amounts and timing for potato (Fig. 2a) were similar to those for sugarbeet. As with the sugarbeet, the amounts measured by the recording rain gauges were lower than what was expected.

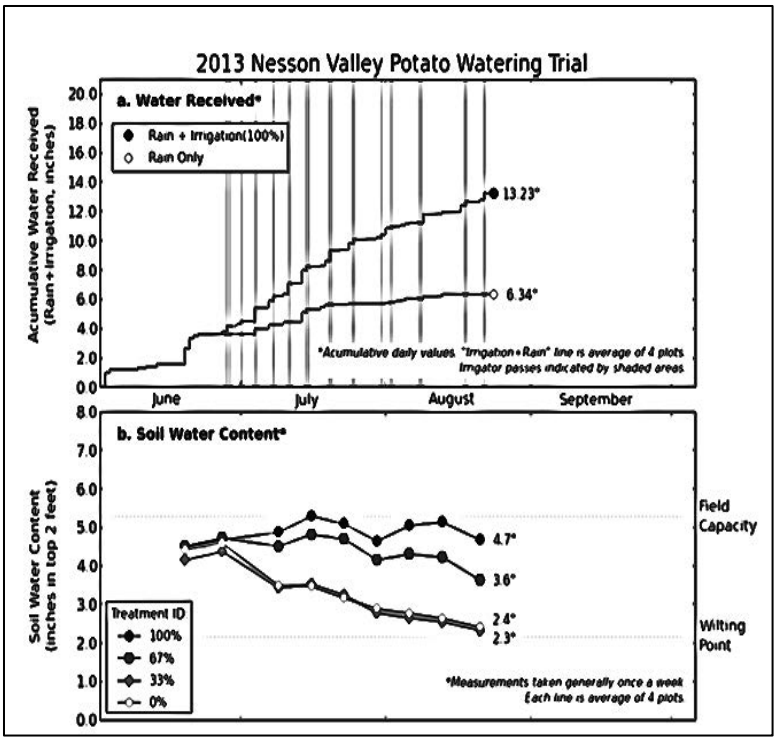


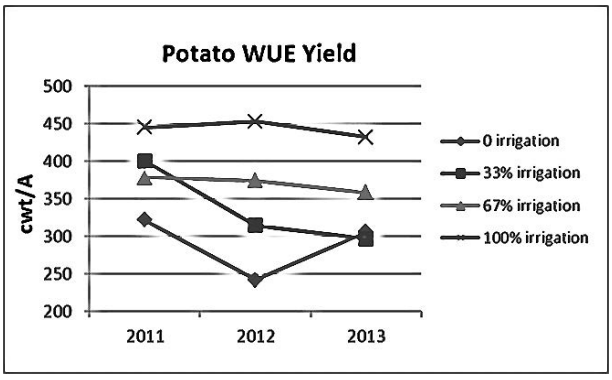
Figure 2: Rainfall, irrigation, and soil water content in potato.

The trends in soil water content for potato (Fig. 2b) were similar to those for sugarbeet except for two marked differences. First, the separation that occurred in early July between treatments never did close the gap like the sugarbeet upper and lower treatments later in the growing season. Soil in the potato plots did not dry as much as the soil in the sugarbeet plots. Even in the non-irrigated plots the soil did not dry to the wilting point, though did come very close prior to harvest. Second, unlike in the sugarbeet, where the ending soil water contents of the four treatments were segregated into two groups, the potato soil water content was separated based on each individual treatment and amount of irrigation water applied. This is the type of separation expected based on irrigation amounts and crop water usage. The soil water content of the two lower treatments differed by less than 0.10 inches and the water content of the two wet treatments differed by 1.1 inches. However, the 100% treatment differed by more than 2.35 inches from the lower two treatments.

Potatoes were harvested on August 28. Potatoes from ten feet of row were hand harvested and the tubers were sized and analyzed from each plot treatment. Yield and quality analyses were done at the WREC and J.R. Simplot laboratories. Statistically significant differences in potato yield existed among the treatments (Table 3).

Table 3. Potato performance.

Irrigation	Yield	Specificgravity
	cwt	
0%	305	1.108
33%	297	1.103
67%	358	1.102
100%	432	1.096
CV(%)	12.3	0.7
LSD 5%	63.0	ns



Barley

Barley WUE trial was planted May 7. The emergence date was May 13. The first irrigation for barley occurred on June 28 and the final irrigation occurred on July 30. There were a total of nine irrigations, which resulted in 3.6, 2.4, 1.2, and 0. 0 inches of water applied, respectively for the he irrigation rates of 100%, 67%, 33% and 0%. Total water received (irrigation plus rain) from planting through harvest was 12.8, 11.6, 10.4, and 9.2 inches respectively.

At the beginning of the season, the soil was drier in the barley plots (Fig. 3) than it was in the plots of sugarbeet and potato. The wetter treatments never did gain from the initial measurement but maintained a adequate soil moisture level through crop maturity. The lesser two treatments slowly declined after initial measurement. Irrigation ended July 30 based on barley maturity stage. The soil water content continued to decline all the way through physiological maturity in the upper two treatments. Once the lower two treatments reached wilting point in mid-July they stayed there until harvest.

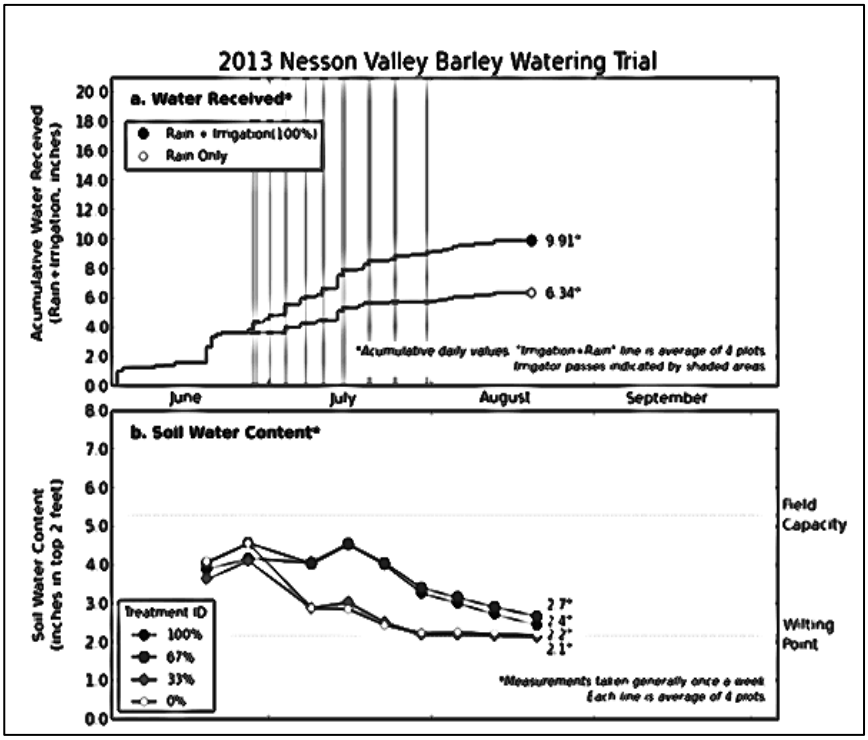
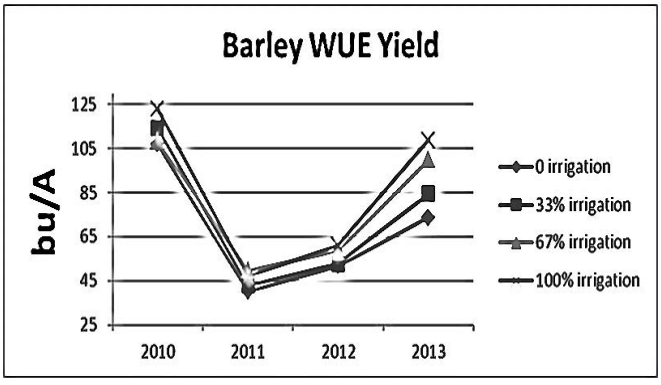


Figure 3: Soil water content in barley.

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

Table 4. Barley performance.

Irrigation	Yield	TW	Protein
	bu/A	*lbs/bu*	*%*
0%	74	51.2	14.5
33%	85	53.0	14.0
67%	100	53.2	14.1
100%	109	53.4	14.3
CV (%)	14.5	1.9	4.5
LSD 5%	21.3	1.6	ns



Wheat

The WUE trial was planted May 8. The emergence date was May 15. There were a total of nine irrigations to wheat. The first irrigation was June 28 and the final irrigation was on July 30. The irrigation rates of 100%, 67%, 33% and 0% from June 28 to July 30 resulted in 3.2, 2.2, 1.1, and 0.0 inches of water applied respectively. Total water received from planting through harvest was 12.4, 11.4, 10.3 and 9.2 inches respectively. Soil water content in the wheat plots was similar to the barley plots with about 4 inches in the top two feet (Fig 4b). Soil moisture levels were maintained in the upper two treatments until August 1 when irrigation was suspended due to crop maturity and lodging concern. Soil moisture content continued to decline through crop maturity in the two higher treatments. The spread in the soil water content among treatments on the last measurement date was similar to that occurring in barley.

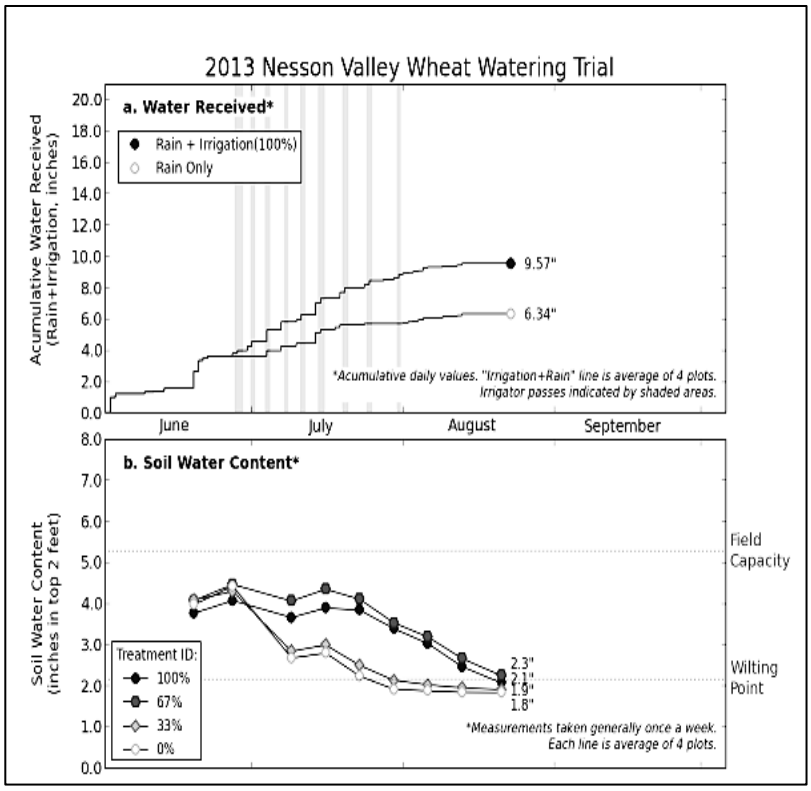
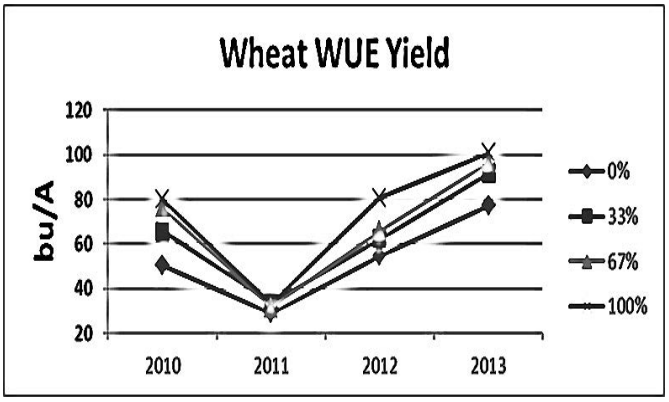


Figure 2: Soil water content in wheat.

Wheat was harvested on August 28. Yield and quality samples were obtained from each plot using a small plot combine. Statistically significant differences in wheat yield and quality occurred among watering treatments (Table 5).

Table 5. Wheat performance.

Irrigation	Yield	TW	Protein
	bu/A	*lbs/bu*	*%*
0%	77	62.6	16.1
33%	91	63.8	15.4
67%	96	62.8	15.7
100%	101	63.5	15.1
CV (%)	10.5	1.4	3.4
LSD 5%	15.4	ns	0.8



"Most folks are about as happy as they make up their minds to be."

~ Abraham Lincoln

Sustainable Agroecosystems for Soil Health in the Northern Great Plains: A New Project at the Williston Research Extension Center

Don Tanaka, Jim Staricka, Kyle Dragseth, Jerry Bergman, Chet Hill, NDSU Williston Research Extension Center

This spring (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, will serve as the project coordinator of this project. Jim Staricka, WREC Soil Scientist, will be investigating soil water use and physical soil quality aspects. Kyle Dragseth, WREC Farm Manager, is overseeing the field work, applying best management practices in the production of all crops. Chet Hill, WREC Area Extension Ag Diversification Specialist, will be conducting economic analysis. Jerry Bergman, WREC Director, is responsible for the overall administration and will assist in the agronomic component of the study. 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:
  - Randomize 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	Biol.Primer1	Pea	Corn	Safflower
Durum	HRWW / BP2	Pea / BP2	Corn	Safflower
····· Perennial Grass Mix with Pollinator Plants ·····				

Biol.Primer1 = Biological Primer 1.
BP2 = Biological Primer 2.

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 grown after a primary crop, seeded before August 10th.

"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	*TBD*	*TBD*	*TBD*	*TBD*
Soybean	*TBD*	*TBD*	*TBD*	*TBD*
Safflower	*TBD*	*TBD*	*TBD*	*TBD*
Sunflower	*TBD*	*TBD*	*TBD*	*TBD*
Pea	*TBD*	*TBD*	*TBD*	*TBD*

TBD = To be determined.

Measurements

- Crop Performance: 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.*

"What is a weed? A plant whose virtues do not exist."

Texas Bix Bender

"What is a weed? A plant whose virtues have not yet been discovered."

Ralph Waldo Emerson

Year End Research Update
Irrigated and Dryland Horticultural Crops

Kyla Splichal and Kim Holloway, NDSU Williston Research Extension Center

Sweet potatoes (Nesson Valley)

This year the sweet potato variety trial was planted on June 5th and 7th. Four reps of four varieties were planted under irrigation at Nesson Valley. Fertilizer was added at the time of planting at the rate of 18.15lbs of nitrogen and phosphorus per acre. Using a base temperature of 50F, the growing degree days for sweet potatoes this year averaged 1,765.The harvest date was October 3rd with the overall top producing variety of Georgia Jet.

Variety	U.S. No 1	Petite	Commercial	U.S. No 2	Total cwt/a
Georgia Jet	247	86	264	114	772
Carolina Ruby	103	38	24	0	165
Beauregard	140	58	95	257	550
Manhan/Bradshaw	56	56	24	0	136
TOTAL					1623

Guar (Nesson Valley)

Due to oil drilling interest and inquiries from locals, we decided to try something different this year. Guar (*Cyamopsis tetragonoloba*), also known as Gavar, Guwar, Guvar or cluster bean is a legume that produces a more familiar product that you may recognize as guar gum. In the U.S. it is most commonly grown in southern states such as Texas and Oklahoma, however, it originates in southern Asia, more specifically, India. Guar gum obtained from the seed's endosperm is considered an effective emulsifier or stabilizer. Guar stabilizes the sand and water mixture used in the hydraulic fracturing process that is involved with horizontal drilling. As of this year we have no yield data except that it produced plants with pods but failed to mature. We plan to try it again next year.

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. This past July the high tunnel was refurbished with permanent end walls and new plastic covering.

This year's raspberries were harvested from mid-July to mid-August with combined weights from fruit inside and outside the tunnel. Both the Nova and K81-6 varieties produced a second fall crop. The old raspberry canes were pruned out this fall. Next season, our goal is to

compare the fruit totals of the three varieties inside the tunnel with the totals of the fruit produced outside the tunnel.

Cultivar	Total lb./a
Boyne	640
Nova	453
K81-6	21

Hops

In 2009, a hops variety trial was started in our on-station gardens. Six varieties were planted. Data was collected from 2010 through 2012. Several varieties appear to be well adapted to our environment. Next fall we will apply for a new and emerging crops grant with the hopes of being able to fund an expanded variety trial and a new hop yard with proper trellising.

Garlic

This fall we planted four varieties of hardneck and one variety of softneck garlic. We are excited to see how this garlic fares in our vegetable gardens.

Vegetable and Flower Gardens

This year we plan to establish an Heirloom Variety Demonstration to showcase the value of open pollinated, traditional and sometimes nostalgic varieties that are still available for the homeowner. We've also decided to try different mulching techniques as part of our weed control methods. In the past, we've conducted the AAS demonstration gardens which we hope to do again next year as well. This fall, we also planted 32 new daylily varieties sent to us from the NDSU Daylily Collection in Fargo. Be sure and come see for yourself all of these new and exciting happenings at the Horticulture Field day next July 10th!

Juneberries

Our 30+ varieties of Juneberries began the growing season with budding on April 25th, well before the snow melted. When all the rain fell in May, conditions were ripe for disease on flowers and forming fruit. Diseases noted were cedar apple rust, powdery mildew, downy mildew, fire blight, and Leaf-berry blight. Needless to say, these diseases caused damage to most of our berry production this year. However, we noted over 1/3 of the varieties showed some resistance to the fungal diseases. Included were eight still-numbered varieties and Kelner, Parkhill, and Martin. On Kelner we noted just deer damage. One Parkhill had a light case of downy mildew. Fungicide applied twice within 8 days took care of most of the disease present in the trial. The remaining shrubs establish nicely and we look forward to next year's berries.

For further information on our native Juneberries, please see the NDSU Extension Service Bulletin H-938 and "Saskatoon Botany" by Richard G. St. Pierre, PhD. (December 2005).

Grapes:

We conducted 3 studies of grapes, which budded the first week of June and were harvested between September 23rd and October 7th, 2013:

1. Variety trial: Comparison of 21 different varieties grown under the same conditions as part of a collaborative study of cold climate grapes.

2. Depth of planting: Assessment of 3 planting depths: 1 foot, 2 foot, and 3 foot of two varieties (St. Croix and Edelweiss) to determine which planting depth shows most plant vigor, grape production, disease- and pest-resistance.

3. Irrigation study: Objectives include: How does water play into vine health? What is the optimum amount for our semi-arid area? How do cold-hardy grapes compare to native, French, or California grapes?

The 2013 grape crop produced well in all the trials, even without much irrigation. The vines were healthy, without significant disease or obvious pests. We harvested, altogether, 757 lbs. (of 392 total available plants, 275 grapevines produced grapes).

Variety Trial:

The trial contained 216 plants, of which 155 produced grapes. These one hundred fifty-five vines produced beautiful clusters of fruit. Even with netting at veraison, the birds are the biggest grape predators on-site, eating or ruining approximately 30% of the grapes.

Valiant out-produced all other vines in the trial with 12 plants producing 31.6 lbs. of grapes. That is 2.63 lbs. of grapes / plant! The variety trial average weight per vine was 1.39 lbs.

No apparent diseases affected the grapes in 2013. We found a few green hornworms and a few leafhoppers, but mostly we had ladybugs and lacewings in the vineyard. Nitrogen/Potassium (28-28-0) was applied at 50 lbs. per acre on April 29, 2013, the day before a snowstorm.

Some of our younger grapes, including 2 varieties newly planted, didn't produce any grapes this year. We look forward to their additional grapes within a few years.

☼ **High Tunnel at WREC** ☼

2013 Variety Trial Grapes

Variety Name	Yield (lbs.) 2011	2012	2013	3 yr. Avg.	Brix	pH	RU	# Vines Producing
Baltica	9.9	0.2	2.2	4.1	23.6	3.5	289	4
Bluebell	3.5	0.0	2.6	2.0	20.7	3.6	269	9
Brianna	0.0	0.0	0.0	0.0	0.0	0.0	0	0
ES 12-6-18	13.5	0.1	8.2	7.3	26.2	3.2	268	12
ES 5-4-71	1.0	0.3	2.4	1.2	18.0	3.1	192	7
Frontenac	14.5	0.8	11.6	9.0	26.7	3.7	366	12
Frontenac Blanc	*	*	0.0	0.0	*	*	0	0
Frontenac Gris	6.8	2.2	7.0	5.3	27.0	3.4	312	10
King of the North	12.7	5.1	8.0	8.6	23.5	3.4	240	12
La Crescent	19.1	7.1	10.7	12.3	24.0	3.1	235	11
Marechal Foch	0.0	0.1	1.0	0.4	23.2	3.4	268	3
Marquette	*	*	1.4	1.4	26.2	3.7	359	9
MN 1131	11.6	0.8	6.4	6.3	26.3	3.7	360	10
Petite Amie	0.0	0.1	0.0	0.0	*	*	0	0
Petite Pearl	*	*	*	*	*	*	0	0
Prairie Star	*	*	0.8	0.8	20.2	3.4	234	3
Riparia	*	0.0	0.2	0.1	23.0	3.3	250	2
Sabrevois	4.5	0.0	1.8	2.1	20.8	3.5	255	8
Somerset Seedless	5.6	0.0	0.3	2.0	*	*	0	11
St. Croix	10.0	1.3	15.0	8.8	21.2	3.1	204	10
Valiant	22.9	6.7	31.6	20.4	22.7	3.3	241	12
Total	240.3	396.2	111.2	--	21.0	3.0	201	155

¹ Brix and pH measured at harvest.
² RU = Brix * pH² (target for white grapes = 200, for red grapes = 260).
*No data exists for these cultivars.

Depth of Planting Study:

Fifty-one vines of two different grapes (Edelweiss and St. Croix) produced roughly 67% of the grapes harvested (510.6 lbs.). St. Croix, planted at 1' depth, outperformed all others with 153 lbs. / 9 vines (17lbs. / vine). Second best depth for St. Croix was the 3' with 117.8 lbs. /7 vines (16.8 lbs. / vine). For the Edelweiss, the 1 foot depth produced the best at 64.4 lbs. (5.85 lbs. / vine. The average yield of grapes in this vineyard was 10 lbs. per vine.

Depth of Planting Study

Variety	Yield (lbs.) 2011	2012	2013	3 yr. Avg.	Brix	pH	RU	# Vines Producing
Edelweiss 1'	6	49.9	64.4	18.7	16.6	3.4	195.2	11
Edelweiss 2'	2.2	58	58.0	20.1	16.4	3.4	193.7	9
Edelweiss 3'	11.1	35.5	37.2	23.4	18.0	3.4	211.8	4
St. Croix 1'	29.0	81	153	42.9	20.7	3.5	252.5	9
St. Croix 2'	8.9	46.7	80.2	19.6	20.0	3.5	245.0	11
St. Croix 3'	28.5	48.3	117.8	27.1	22.0	3.4	260.3	7
Total	85.7	319.4	510.6	305.2	--	--	--	51

"Gardeners are undeniably "Nuts". It probably comes from stepping on their rakes, tines up, too many times."

Texas Bix Bender

North Dakota Home Garden Variety Trial 2013

The Williston Research Extension Center participated in the Home Garden Variety Trials in the Extension service. We ordered plants for 41 different vegetable comparisons. Some we started in our greenhouse to give them a head start; some we direct-sowed. From beans to watermelons to zinnias WREC planted, tended and harvested hundreds of colorful, flavorful, beautiful fruits, flowers, and leaves. The summer harvest started unhurriedly with lettuce and beans and ended with a flourish of melons and root vegetables. Delightful!

For further information on the Home Garden Variety Trials for 2013, please see http://www.dakotagardener.com/trials. Results from around the state should be out soon! If you're interested in participating next year please contact Mr. Tom Kalb at tom.kalb@ndsu.edu.

All-America Selections

The All-America Selections Demonstration Garden highlights winners of the national performance contest held each year. In our AAS garden this year we showed off some regional winners of zinnias, geraniums, violets, cannas, tomatoes, and peppers. Wow, they did well! We hope you got out here to see them this year. If not, please come next spring and summer. We'd love to show you around!

Rhubarb

Our yield for the five varieties of rhubarb outpaced recent years. The plants showed up before the snow left. We could have continued harvesting until mid-August if we'd desired. However, we harvested only once on May 29-30 2013.

2013 Rhubarb Variety Trial			
2011	2012	2013	3-year avg.
136 lbs.	110 lbs.	164 lbs.	137 lbs.

Landscape

We spent much of our summer updating the landscape around the Ernie French Center, renewing it and getting weeds under control. We hope you like it. Please tell us so on our Facebook page. We took pictures before and after.

We also installed a new deer fence around the demonstration gardens, juneberries and north vineyard. We had no deer predation after its installation the last weekend in June.

"No matter how big or small a garden is, there is never enough time to get everything done."

Texas Bix Bender

Sprinkler Irrigated Onion
Sidney, MT

Cultivar	Color	Stand, Plants/ac	% Single Centers	Average Weight, oz	Average Diameter Inches	% < 2.25 Inches Diameter	% > 3 Inches Diameter	Yield, lbs/ac
SV6672 NW	yellow	65340	43.3	5.4	2.5	22.5	21.9	22150
Calibra F1	yellow	54900	20.0	5.3	2.5	31.4	14.1	18230
Sedona	yellow	56720	43.3	4.9	2.3	41.4	4.9	17320
Elbrus	yellow	58530	40.0	4.5	2.4	34.7	9.3	16410
Delgado	yellow	55810	40.0	4.4	2.3	42.9	11.0	15410
Crockett	yellow	57170	23.3	4.3	2.2	47.5	2.2	15200
SV4643 NT	red	59440	26.7	3.8	2.1	55.0	0.8	14150
Cruiser	yellow	67610	53.3	3.3	2.0	69.3	0.0	13920
Gunnison	yellow	45380	36.7	4.8	2.4	29.0	6.1	13760
Safrane F1	yellow	54900	16.7	3.9	2.1	54.6	0.0	13450
Frontino	yellow	42200	90.0	4.2	2.0	62.4	9.7	11160
Patterson	yellow	55360	20.0	3.2	2.0	62.9	1.8	11140
LSD 0.05		9145	27.9	0.5	0.2	14.0	8.3	2916

Planted: May 17, 2013 **Harvested:** October 1, 2013
Previous crop: Sugarbeet

NEWS ON AGRICULTURE DIVERSIFICATION/PROCESSING

Chet Hill, NDSU Area Ag Diversification Extension Specialist

Mother Nature keeps surprising us with interesting weather. The region received much above normal precipitation. This spring planting season was extended because of wet conditions. The unique part of the weather this year was the temperatures. It was a somewhat cool growing season with one of the warmest temperatures being on our field days.

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 areas with Fusarium head blight or scab. The wet conditions during flowering created the perfect conditions for fusarium to become a problem. The mild fall, with the first killing frost occurring in October, made for favorable growing conditions for the late season and late planted crops to mature. Field pea acres in North Dakota remained high and performed very well, while lentil acres decreased and weather related conditions made for a poor yielding crop due to poor stands. Field pea prices have rebounded a little bit, while lentil prices have dropped down to the high teens to the low twenty cent range.

For the producers utilizing irrigation the warm late season crops like corn, soybeans, and sunflowers did well this year. The warm summer extended weather and higher than normal humidity assisted in the maturing of these crops. Corn harvest was hampered by wet fall conditions and high grain corn moisture content. Disease scouting and fungicide management are still the keys to improve yield and quality management. 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 intensive water, fertilizer, and disease management practices by producers.

The WREC continues to conduct off-station plots at Arnegard, Stanley, Crosby and added another site south of Beach this year. Barley, spring wheat, durum, field peas, conventional lentils and Clearfield lentils were included in the sites. A cover crop demonstration plot was also planted at each off-station plot. Due to some spray drift, the off-station pulse crops suffered significant herbicide damage. The spring/summer seeded cover crops yields continue to generate three to four tons of biomass.

WREC – Much of the staff is new at WREC. The staff made great progress in conducting research experiments. WREC is searching again for an agronomist and this search has a few promising applicants.

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 have 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.nodak.edu/willisto/

PROJECTS – I continue to receive inquiries from pulse crop processors to determine the viability of MonDak locations for possible processing plants. I will continue to update the map for the MonDak region showing the number and location of irrigation pivots. 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. Currently, there are approximately 700 pivots in the region that stretches from Glasgow, MT to Stanley, ND and from Fortuna, ND to Miles City, MT. The MonDak region has the opportunity to expand irrigated acres by another 250,000 acres. The Williston Regional Economic Development Corporation and WREC continue to work and explore expanded potato production and processing here in the region. The MonDak Gold variety, a red skin yellow flesh potato, was tested and developed in western North Dakota in partnership with the University of Minnesota. This potato variety has marketing potential in the fresh pack market and for specialty processing potato products.

WREC FOUNDATION SEED INCREASE UPDATE

Kyle Dragseth, Sanford Qvale, David Weltikol, Kelly Stehr, NDSU Williston Research Extension Center

Hello to you all! We hope you all had a great 2013 growing season and are getting geared up for another great year in 2014. 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 have 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.

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	Durum	HRWW
Barlow	Alkabo	Decade
Mott	Carpio	Ideal
Elgin	Tioga	Jerry
Velva		
Reeder		

Eastern Agricultural Research Center Foundation Seed Increase

V

Varieties include the following:

HRSW	SAFFLOWER
DuClair	Cardinal
	Morlin
	Nutrasaff

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.

Eastern Ag Research Center Staff

Johannes Schneider	Plant Pathologist/Supt.
Ron Brown	Farm Mech/Research Asst.
Joyce Eckhoff	Agronomist
Charles Flynn	Chemist
Rebecca Garza	Research Assistant
Cherie' Gatzke	Administrative Assistant
Calla Kowatch-Carlson	Research Assistant
Mary Schaff	Research Assistant
Renee Sundheim	Research Assistant

Seasonal Employees:

Jorden Cotter	Richard "Red" Lovec
Laura Kowatch	Charles "Chuck" Lowman

Summer Employees:

Miriam Backhaus	Daryn Wolff

Williston Research/Ext Center Staff

Jerald Bergman	Director
Diana Amiot	Ag Research Specialist
Kyle Dragseth	Farm Manager
Chet Hill	Ag Diversification Ext Spec
Kim Holloway	Ag Res Specialist/Horticulture
Chelsey Penuel	Ag Research Specialist
Sanford Qvale	Seed Production Specialist
Kyla Splichal	Ag Res Specialist/Horticulture
James Staricka	Soil Scientist
Kelly Stehr	Administrative Assistant
Katie Stromme	Irrigation Research Tech
Tyler Tjelde	Irrigation Scientist
Cameron Wahlstrom	Irrigation Research Spec
David Weltikol	Ag Technician-Mechanic

Seasonal Employees:

Ian Ferrell	Charles Flynn
Brandon Gray	Moriah Juhl
Emily Liere	Ida Purkey
Brad Raab	Lynn Staricka
Sandy Spurlock	Don Tanaka
Brittany Woods	Brennon VanCouwenberghe

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2013 EARC Field Day

Dr. Jerry Bergman welcoming guests to 2013 WREC Dryland Field Day.

Ron Brown – 2013 EARC Field Day

2013 WREC Dryland Field Day