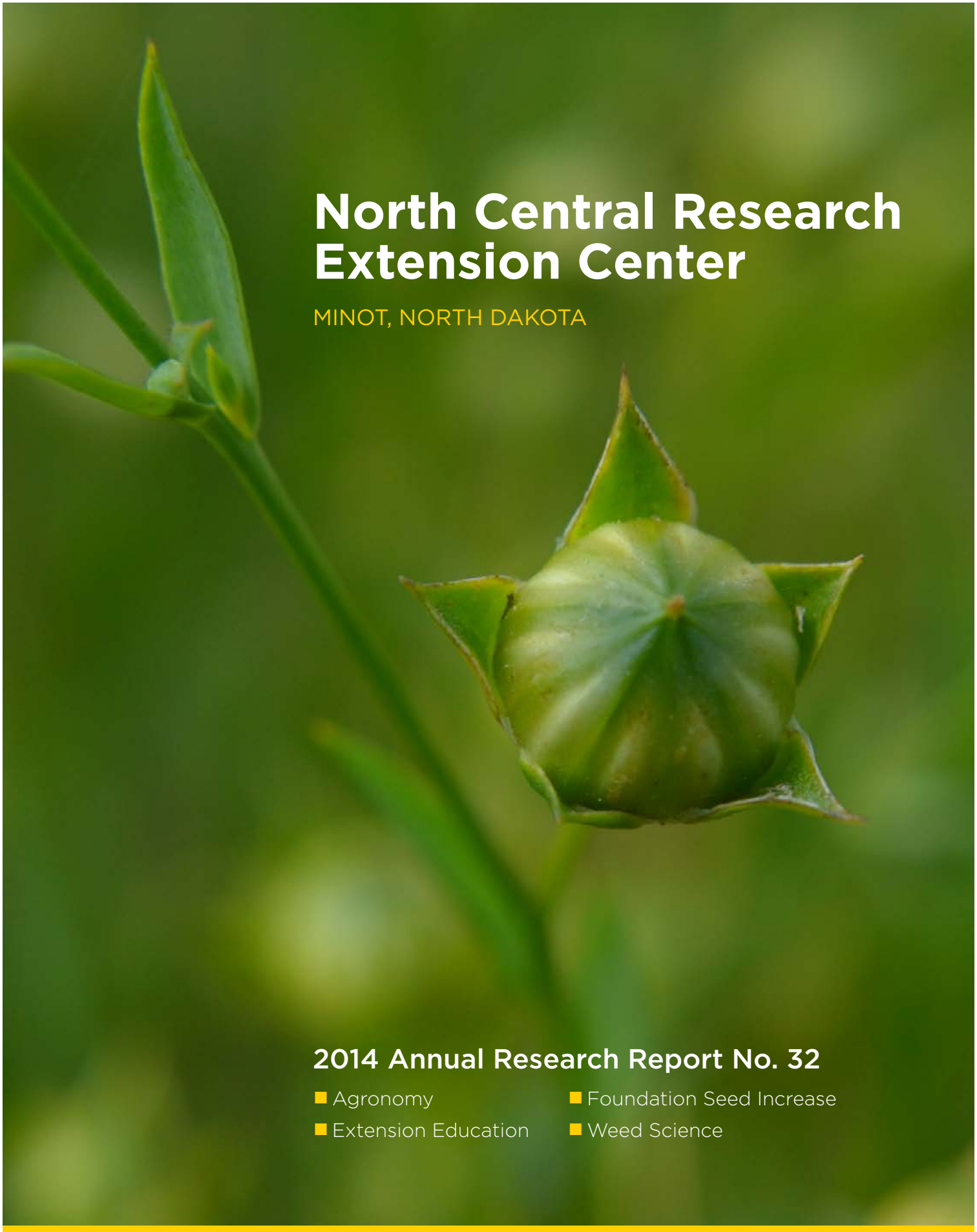

North Central Research Extension Center

MINOT, NORTH DAKOTA

2014 Annual Research Report No. 32

- Agronomy
- Extension Education
- Foundation Seed Increase
- Weed Science

NDSU EXTENSION SERVICE

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Our goals at the North Central Research Extension Center (NCREC) are to conduct research to find practical answers to crop production problems, conduct educational programs and demonstrations to address these problems, and to increase foundation grade seed of new and popular varieties for this area. New crops, varieties, and production methods are tested as they become introduced to determine their feasibility in our environment.

Agronomy

The NCREC continues to be an important source of agronomic information for growers as they select cultivars adapted to their farming operations and make management decisions. Cropping systems and crop production studies, public and private seed company hybrid/variety performance trials, and advanced breeder nurseries are evaluated in replicated field trials at the center. Cereal grains, broadleaf crops, oil-seed crops, and many other new alternative crops are evaluated for their agronomic traits, seed quality, and yield potential. Off-station research trials are conducted to supplement and enhance on-station research efforts. Off-station sites have been established at Mohall (Renville County), Rugby (Pierce County), Garrison (McLean County), and at Wilton (Burleigh County) to evaluate cereal grains, pulse crops, and soybeans. NCREC provides an excellent source of data regarding the performance of both public and private crop varieties.

Bio-energy continues to be a national priority and is a significant focal point in our research efforts to develop new sources and enhance traditional feedstock sources for north central North Dakota. A long-term biomass study was established in 2006 and is continuing to determine the potential value of perennial plant species in the cellulosic ethanol bio-refinery industry. Corn hybrid performance evaluations continue to increase as additional acres are required to support the ethanol industry. Canola and numerous other oilseed crops are being evaluated to identify high oil and high seed yield lines adapted to this region. The center invested a significant amount of effort into Ethiopian mustard (*Brassica carinata),* a potential bio-energy feedstock with growth habits similar to canola. Other promising bio-energy crops including pennycress and energy beets are being evaluated at the center. These efforts will undoubtedly continue to grow as national policy and consumer demand dictates the use of more environmentally friendly and sustainable sources of energy.

North Dakota leads the nation in the production of 13 crops. The NCREC works closely with all 10 of the plant breeding programs at NDSU. The goal of the NDSU plant breeding programs are to improve and enhance the genetic makeup of all major crops being grown in North Dakota and is the primary reason for the $4 billion in on-farm cash receipts each year. The center evaluates more than 3000 experimental lines every year. Experimental varieties which are especially adapted to this growing region are identified, followed by seed increase and distribution as foundation seed. Clean, genetically pure seed provides farmers with enhanced yield, quality, and disease resistance of the new varieties brought forward. In 2013, the NCREC undertook a new research initiative with the introduction of more than 2000 grape accessions with a primary objective of developing cold hardy adapted varieties. This effort will have an immediate and direct impact on this new and rapidly growing high value industry.

North Dakota leads the nation in production of both dry pea and lentil. Because of the need for new varieties specifically adapted to North Dakota, the legislature approved the establishment of a pulse crop breeding program at NDSU. This legislative initiative provided two new positions: a pulse crop breeder stationed in Fargo and an assistant pulse crop breeder located in Minot. The position in Minot is advantageous because it gives the breeding program a strong presence and is centrally located in the main pulse growing region of North Dakota. The main goal of this program is to develop new varieties of dry pea, lentil, and chickpea for North Dakota producers. Experiments conducted in Minot and the surrounding region will include variety trials, early and advanced yield trials, disease screening nurseries, and single plant/row selections. Utilization of onsite greenhouse space to conduct crop breeding of favorable traits will continue.

Extension Education

The NCREC strives to provide information which producers can use to help make management decisions and keep pace with the dynamic agricultural industry. Along with planned educational programs, the extension staff at the NCREC work together with county extension staff to address immediate production issues as they arise throughout the season. In some cases, informational meetings are coordinated to provide knowledge and education on issues at hand. Producers should also feel free to call the NCREC (701-857-7682) anytime they would like to discuss a particular issue with a crop, soil, or livestock specialist.

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The North Central Region of North Dakota has a diverse agricultural landscape with many different crops and types of agricultural operations. The NCREC works closely with NDSU state specialists and county extension staff to develop educational programs to address various issues pertaining to crop/soil and livestock production systems. The 2014 program events included but were not limited to crop/soil clinics, scout schools, field day presentations, commodity group meetings, marketing clubs, cow calf and feedlot workshops, range tours, and youth livestock shows.

Crop Protection: The weather was favorable for disease development in many crops this year. Among the insect pests grasshopper infestation was in low to moderate amounts in cereal crops. Cereal aphids and thrips made their appearance, but didn't contribute to any major yield losses. Fusarium head blight has been the leading disease in cereals and was well managed in spring wheat, but not in winter wheat this year. Tan spot and septoria leaf spots made their appearances early in wheat. In barley incidences of net blotch, spot blotch, and Fusarium head blight were reported. Alfalfa weevil infestation was reported, but was managed without serious damage. Soybean fields had the incidence of diseases such as the bacterial leaf spot and brown leaf spot; it's worth mentioning not to go for a bactericide or fungicidal spray as the soybean plant can retaliate the damage caused by these diseases. Moderate incidence of soybean white mold have been received from many counties. The corn crop was mostly free of diseases. European corn borer has been a problem in the hybrids that do not have resistance for this trait. Among the corn ear rots, minor incidences of Fusarium ear rots have been reported. Sunflowers had the infestations of bud moth, banded sunflower moth, red sunflower weevil, and stem borers. Whereas, white mold, phoma, and phomopsis were the leading diseases that infected sunflowers this year. Canola had severe flea beetle infestation in the start of the season. Among the canola diseases black leg, white mold, and aster yellows have been reported all over the north central regional counties. Moderate white mold incidences have also been reported in lentils and dry beans.

Cropping System: Agronomic program activities in 2014 included participation in commodity group meetings, REC and county-based field tours, and county extension agent trainings. We continue to educate youth on the importance of agriculture as well as promoting future careers in the agricultural industry. Research/extension efforts included participation in the state-wide projects aiming to increase durum yield and quality and correlating proper stand establishment in corn to overall crop yield.

Livestock: 2014 was a good production year and a rising market to record prices associated with reduced cattle inventories and cheaper feeds. Increased profitability in the cow-calf sector has generated interest in new young producers, herd expansion, operational improvements, and new technologies. These issues have been addressed with a beginning ranchers one day business workshop (The Business of Ranching), a demonstration of the cattle handling facilities (Mountrail Ranch Tour), explanation of DNA tests for genetic evaluation (SW Beef Days), development of spreadsheets for planning and budgeting, and numerous individual consultations. On-going programs including the ND Feedlot School, Backgrounding Series, and local county organized meetings were supported with participation and presentations.

Soil Health: Activities at the NCREC continued to focus on soil salinity. County based workshops highlighted management of saline areas. A field day was held at the NCREC that covered salinity management and highlighted a salinity tolerance demonstration of various crops and cover crops. Soil water management was another issue seen in North Dakota. Education on soil water management was delivered through webinars and at county workshops/field tours. Corn and wheat nitrogen fertilizer recommendations have recently been updated and have been shared with County Agents and many growers.

Foundation Seed Increase

The NCREC foundation seed program works closely with the Foundation Seedstocks program and plant breeders at NDSU's main campus in Fargo. The NCREC's role is to help facilitate the increase of new varieties from Fargo's main campus out to producers in north central North Dakota. The program also maintains inventory of several popular varieties among eight different crops that are grown in the area. To give a degree of impact to the region, the NCREC marketed seed to 110 producers in 10 different states in 2013-2014.

The different crops and varieties that will be available for the 2014-2015 cropping season:
Barley–Tradition, Two-Row Experimental
Durum–Divide, Joppa
Flax–Omega, York, Gold-ND
HRSW–Barlow, Elgin, Glenn
HRWW–Decade, Darrell, Ideal
Lentil–Crimson (red), Pennell (green)
Oat–Jury

Weed Science
Weed control studies are conducted in small grains, canola, sunflower, safflower, flax, dry bean, pea, lentil, chickpea, mustard, corn, and soybean. We are evaluating new herbicides/adjuvants or different uses of existing products in various crops. Other experiments involve evaluation of the impact of different cultural practices such as crop rotation and conventional tillage vs. no-till on crop yield, seed quality, weed control, and economic feasibility. We also conduct IR-4 residue trials to collect data for registration of pest control products in minor crops. We have studies that target specific weeds such as Canada thistle, wild oat, foxtails, biennial wormwood, kochia, common mallow, common milkweed, and others.

Weather Conditions—Minot

	2014 Precipitation	108 Year Long Term Average	Departure from Average	2014 Average Degrees	108 Year Long Term Average	Departure from Average
	----------Inches----------			----------Fahrenheit----------		
January	0.3	0.6	-0.2	8.0	7.3	0.7
February	0.2	0.5	-0.3	4.5	12.1	-7.6
March	0.3	0.7	-0.5	20.9	24.3	-3.4
April	2.1	1.5	0.7	36.9	40.6	-3.7
May	1.7	2.4	-0.7	53.5	53.3	0.2
June	7.1	3.2	3.9	62.1	62.7	-0.6
July	2.2	2.3	-0.2	66.3	68.4	-2.1
August	4.4	2.0	2.5	67.0	66.7	0.3
September	0.6	1.5	-0.9	58.2	56.1	2.1
October	0.7	1.1	-0.4	46.0	43.9	2.1
November	0.7	0.7	0.0	20.2	27.2	-7.0
Total	**20.3**	**16.5**	**3.8**	**40.3**	**42.1**	**-1.7**

	2014	108 Year Long Term
Coldest Date	Mar 01	Feb 15, 1936
Coldest Temp	-24	-49
Days ≤ 0°	66	51
Days ≥ 90°	3	12
Highest Date	May 29	Jul 11, 1936
Highest Temp	91	109
Last Spring Frost	May 15	May 19
First Fall Frost	Oct 3	Sep 17
Frost Free Days	140	121
GDD for Corn (May 15-Oct 15)	2021	1994
GDD for Wheat (Apr 15-Aug 31)	3906	4047
GDD for Sunflower (May 15-Oct 15)	2940	3010

Hard Red Spring Wheat Variety Descriptions

Variety	Agent or Origin[1]	Year Rlsd	Height (in)	Straw Strgth[2]	Days to Head[3]	Reaction to Disease[4] Stem Rust[5]	Leaf Rust	Leaf Spot[6]	Bact. Leaf Streak	Head Scab
Advance	SD	2012	32	6	64	R	MR/MS	M	MS	MS
Alpine[7]	AgriPro	2008	34	6	62	MS	S	MS	S	MS
Barlow	ND	2009	35	6	62	R	MS	MR	MS	M
Brennan	AgriPro	2009	30	4	62	R	MR	M	MS	MS
Brick	SD	2009	35	5	60	R	MS	MS/S	NA	MR
Duclair[8]	MT	2011	31	4	65	R	NA	NA	NA	NA
Elgin-ND	ND	2012	36	5	65	R	MS	M	MS/S	M
Faller	ND	2007	35	5	65	R	S	MR	MS	M
Forefront	SD	2012	37	5	61	R/MR	MR	MR	M	MR
Glenn	ND	2005	37	4	61	R	MS	M	M/MS	MR
HRS 3361	**Croplan**	**2013**	**33**	**3**	**65**	**NA**	**MS/MR**	**MR**	**NA**	**M**
HRS 3378	**Croplan**	**2013**	**32**	**4**	**64**	**NA**	**MR**	**M**	**NA**	**M**
HRS 3419	**Croplan**	**2014**	**32**	**2**	**68**	**NA**	**MR**	**MR**	**NA**	**MR**
Jenna	AgriPro	2009	32	4	66	R	MR	M	M/MS	M
Kelby	AgriPro	2006	30	4	62	R/MR	MR/MS	M	S	M
Kuntz	AgriPro	2007	31	4	65	NA	MS	MS	NA	M
LCS Albany	Limagrain	2008	32	5	67	NA	MR	MS	M	M
LCS Breakaway	Limagrain	2011	32	5	63	R	R	MS	MS	M
LCS Iguacu	**Limagrain**	**2014**	**33**	**3**	**66**	**NA**	**MS**	**M**	**M/MS**	**MR**
LCS Powerplay	Limagrain	2011	33	5	65	R	MS	MS	S	M
Linkert	MN	2013	31	2	63	R	MR/MS	M	MS	M
Mott[7]	ND	2009	36	3	66	R	MS	MS	MS	MS
MS Chevelle	**Meridian**	**2014**	**30**	**5**	**63**	**NA**	**R**	**NA**	**NA**	**M**
MS Stingray	Meridian	2013	35	NA	67	NA	MS	NA	NA	NA
ND901CL PLUS[9]	ND	2010	36	4	60	MR	MS/MR	NA	NA	M
Norden	MN	2012	32	3	6	R	MR/MS	M	S	M
Pivot	WestBred	2010	27	3	67	NA	S	MR	NA	S
Prevail	**SD**	**2014**	**31**	**4**	**64**	**NA**	**MR**	**MS**	**NA**	**M**
Prosper	ND	2011	35	5	65	R	MS	M	MS	M
RB07	MN	2007	32	5	62	R	MS	MS	MS/S	MR
Rollag	MN	2011	32	3	63	R	MR/MS	MR	M	MR
Sabin	MN	2009	33	6	65	R	MR/MS	MS	NA	M
Samson	WestBred	2007	31	2	63	O	MR/MS	MS	MS	S
Select	SD	2010	35	6	60	R	MS	R/MR	S	MR
SY Ingmar	**Syngenta/AgriPro**	**2014**	**31**	**4**	**64**	**NA**	**MR**	**M**	**M**	**M**
SY Rowyn	Syngenta/AgriPro	2013	31	4	62	R	R	M	M	M
SY Soren	Sygenta/AgriPro	2011	30	4	63	R	R	M	S	M
SY Tyra[8]	Sygenta/AgriPro	2011	31	5	62	R	R	MS	S	S
Vantage	WestBred	2007	32	2	67	MR	R	MS	MS/S	MS
Velva	NDSU	2011	35	4	63	R	R	M	S	MS
WB9507	**WestBred**	**2013**	**32**	**5**	**61**	**NA**	**MR**	**R**	**NA**	**MR**
WB9879CLP[9]	**WestBred**	**2012**	**33**	**4**	**64**	**NA**	**MS**	**MR**	**NA**	**MS**
WB Digger	WestBred	2009	34	6	63	MR	R	M	NA	MS
WB Gunnison	WestBred	2013	31	NA	65	NA	MS	MS	M	MS
WB Mayville	WestBred	2011	30	4	63	R	R	MS	S	S

[1] Refers to agent or developer: MN = University of Minnesota, MT = Montana State University, ND = North Dakota State University, SD = South Dakota State University. ***Bold*** *varieties are those recently released, so data is limited and rating values may change.*

[2] Straw Strength = 1 to 9 scale, with 1 the strongest and 9 the weakest. These values are based on recent data and may change as more data become available.

[3] Days to Head = the number of days from planting to head emergence from the boot averaged from several locations and years.

[4] R = resistant, MR = moderately resistant, M = intermediate, MS = moderately susceptible, NA = Not adequately tested, S = susceptible.

[5] Fargo stem rust nursery inoculated with Puccinia graminis f.sp. Tritici races TPMK, TMLK, RTQQ, QFCQ and QTHJ.

[6] Leaf spot refers to the leaf fungal diseases such as tan spot and septoria. It does not include bacterial leaf streak.

[7] Hard white wheat.

[8] Solid stemmed or semisolid stem, imparting resistance to sawfly.

[9] CL = refers to a Clearfield variety, with tolerance to the Beyond family of herbicides.

Note: Published in NDSU publication A-574 (revised).

Hard Red Spring Wheat Variety Trial **North Central Research Extension Center—Minot**

Variety	Days to Head	Plant Height	Lodging	Test Weight	Protein	Grain Yield 2012	2013	2014	2 Year	3 Year
	DAP[1]	inches	0-9[2]	lbs/bu	%	----------bu/A----------				
Faller	55	39	1	62.7	12.7	47.4	63.4	76.4	69.9	62.4
LCS Albany	57	36	2	62.6	12.1	46.9	62.8	77.1	69.9	62.3
Prosper	54	39	1	63.1	13.1	44.2	66.2	74.7	70.5	61.7
Advance	54	38	1	62.4	12.4	55.5	59.1	67.1	63.1	60.5
Howard	53	41	1	61.8	14.4	51.1	54.0	72.0	63.0	59.1
LCS Powerplay	52	36	1	61.4	13.9	52.6	58.3	65.0	61.6	58.6
Steele-ND	52	40	1	61.4	14.2	50.0	54.8	69.3	62.1	58.0
Prevail	51	38	0	61.1	13.8	52.4	47.3	74.1	60.7	57.9
Select	49	39	0	59.9	13.3	58.7	59.9	53.4	56.7	57.3
Velva	54	40	0	59.6	13.8	50.6	54.5	66.2	60.4	57.1
WB Digger	54	39	1	61.8	13.5	34.5	66.6	68.8	67.7	56.6
Rollag	53	35	0	61.5	14.0	51.0	54.1	63.2	58.6	56.1
Barlow	50	38	0	61.1	14.4	50.8	54.5	62.2	58.3	55.8
LCS Breakaway	52	34	0	63.7	14.5	51.3	53.0	63.1	58.0	55.8
WB Breaker	53	36	0	64.4	13.5	52.1	49.9	64.5	57.2	55.5
Norden	53	35	0	63.7	13.4	57.8	53.6	54.3	53.9	55.2
Mott	54	40	0	61.1	13.6	47.4	56.6	60.6	58.6	54.9
Duclair	51	37	0	59.0	14.0	39.9	56.1	66.6	61.3	54.2
WB Sampson	54	32	0	59.4	13.0	40.7	55.3	65.0	60.2	53.7
SY Tyra	53	32	0	60.6	13.2	47.4	56.9	56.7	56.8	53.7
RB07	53	37	0	59.9	13.4	46.4	51.4	61.1	56.3	53.0
Elgin-ND	54	40	0	60.8	13.9	38.2	58.3	62.3	60.3	52.9
WB Mayville	51	31	0	61.1	14.1	42.8	49.2	66.6	57.9	52.9
Fryer	52	38	0	60.0	13.8	45.6	51.1	60.9	56.0	52.5
Jenna	56	35	0	61.9	14.3	36.2	53.0	67.5	60.3	52.2
ND901CL+	52	40	0	60.4	14.6	43.1	52.8	59.9	56.4	51.9
SY605CL	51	39	0	59.0	13.3	37.8	55.6	60.4	58.0	51.3
WB Vantage	56	35	0	63.3	14.4	44.9	51.5	56.3	53.9	50.9
Glenn	51	40	0	61.2	14.6	46.3	48.6	57.5	53.1	50.8
SY Soren	53	34	0	61.7	13.6	36.4	53.1	62.3	57.7	50.6
Brennan	53	33	0	59.7	14.7	48.1	45.4	54.1	49.7	49.2
Forefront	50	41	0	60.6	13.5	43.4	48.3	55.8	52.0	49.2
Kelby	51	36	0	60.4	13.7	48.7	40.3	54.9	47.6	47.9
Choteau	53	37	1	57.2	13.6	46.5	44.3	52.6	48.5	47.8
WB Gunnison	54	34	0	62.5	13.0	37.6	45.7	60.2	52.9	47.8
Alpine	54	38	0	60.0	12.8	36.4	51.2	55.7	53.5	47.8
Briggs	51	36	1	60.0	14.4	27.0	53.3	56.4	54.8	45.6
MS Stingray	59	39	1	62.3	10.9	--	61.7	75.1	68.4	--
SY Rowyn	53	35	0	60.6	12.9	--	47.2	74.6	60.9	--
LCS Iguacu	56	36	0	61.2	12.0	--	55.6	60.0	57.8	--
HRS 3361	54	37	0	60.7	13.8	--	57.2	56.6	56.9	--
HRS 3378	54	36	0	62.8	13.1	--	53.0	58.7	55.8	--
Linkert	53	32	0	59.7	14.3	--	49.3	61.1	55.2	--
SY Ingmar	54	35	0	62.4	14.1	--	--	68.1	--	--
HRS 3419	58	37	0	60.5	11.5	--	--	67.7	--	--
MS Chevelle	51	35	0	59.7	12.7	--	--	65.0	--	--
Mean	53	38	0	61.2	13.5	46.9	54.5	62.9	--	--
C.V.%	2.3	3.9	179	1.7	6.8	8.2	6.4	11.3	--	--
LSD 10%	1	2	1	1.2	1.1	4.5	4.1	8.3	--	--

[1] *DAP = Days after planting.* [2] *Lodging: 0 = none, 9 = lying flat on the ground.*

Planted on May 15 with a seeding rate of 1.25 million PLS/A and harvested on August 30.

Previous Crop: 2011 & 2012 = field pea, 2013 = soybean.

Soil Type: Williams Loam

Late Seeded Hard Red Spring Wheat Variety Trial—Minot

Variety	Days to Head	Plant Height	Lodging	Test Weight	Protein	Grain Yield
	DAP[1]	inches	0-9[2]	lbs/bu	%	bu/A
Velva	48	36	2	55.8	14.4	65.5
Linkert	49	32	1	57.9	14.7	63.9
ND901CL+	49	39	1	56.7	15.3	63.7
Brennan	49	32	6	57.9	14.2	63.5
Mott	48	38	1	58.1	14.1	62.9
Prevail	48	37	3	57.3	14.2	61.8
SY Soren	48	31	5	56.9	14.7	61.8
Barlow	48	34	3	57.4	14.5	60.0
LCS Iguacu	51	35	2	59.6	12.6	59.5
Faller	49	35	7	55.4	14.4	58.2
MS Stingray	53	36	3	57.7	12.2	57.9
Elgin-ND	50	39	7	55.8	14.5	57.8
Prosper	50	35	5	58.5	13.6	57.7
Steele-ND	52	33	4	58.1	13.3	57.5
Kelby	49	32	6	56.4	14.5	57.3
RB07	49	36	5	56.3	14.7	57.1
Glenn	49	36	1	57.3	14.3	56.6
WB Mayville	50	34	3	55.8	15.1	56.6
Duclair	47	34	5	53.2	14.4	52.7
Briggs	50	33	5	57.6	14.4	52.3
Select	48	37	4	58.0	13.6	51.9
Trial Mean	49	35	4	57.1	14.2	58.6
C.V.%	3.7	3.8	63	2.5	2.8	5.5
LSD 10%	2	2	3	1.7	0.5	3.8

[1] *DAP = Days after planting.*

[2] *Lodging: 0 = none, 9 = lying flat on the ground.*

Planting Date: June 10
Planting Rate: 1.25 million PLS/A
Harvest Date: October 8
Previous Crop: hrsw
Soil Type: Williams Loam

Hard Red Spring Wheat Variety Trial at Mohall
Cooperators: Dean Schoenberg and the Renville/Bottineau Ag Improvement Association

Variety	Plant Height	Test Weight	Grain Protein	Grain Yield
	inches	lbs/bu	%	bu/A
MS Stingray	36	62.1	10.2	81.4
LCS Albany	33	63.6	12.5	79.2
SY Rowyn	33	63.1	12.2	75.3
Faller	36	62.5	12.5	68.1
Prosper	37	63.3	12.7	67.8
Elgin-ND	39	61.8	14.6	66.2
LCS Iguacu	31	63.5	10.5	62.4
Select	38	64.4	13.3	61.0
Prevail	35	62.7	13.1	57.8
Advance	34	62.4	13.3	57.7
WB Vantage	36	63.5	13.5	57.0
LCS Breakaway	30	64.4	11.1	56.7
Jenna	32	61.1	13.0	56.7
Forefront	38	63.1	13.1	56.5
Barlow	36	64.2	14.1	54.9
LCS Powerplay	31	63.0	12.3	53.9
SY Soren	30	62.6	14.3	53.4
Glenn	37	65.1	13.8	53.1
Velva	36	60.5	14.1	52.6
Brennan	30	61.6	14.2	51.0
WB Mayville	30	61.0	14.0	49.1
Kelby	32	61.7	13.7	47.7
Linkert	28	62.5	13.5	44.3
Trial Mean	34	62.8	13.1	59.6
C.V.%	4.0	0.8	3.8	7.8
LSD 10%	2	0.6	0.6	5.5

Planting Date: May 28
Planting Rate: 1.25 million PLS/A
Harvest Date: September 12
Previous Crop: Canola
Soil Type: Barnes loam

2014 HRSW Variety Trial at Rugby

Cooperators: Dave Teigen and the Pierce County Crop Improvement Association

Variety	Plant Height	Test Weight	Grain Protein	Grain Yield		
				2013	2014	2 yr avg
	in	lb/bu	%	bushels per acre		
LCS Albany	32	62.1	11.6	69.6	73.1	71.3
Faller	33	61.8	13.9	68.2	72.0	70.1
Jenna	31	59.8	14.0	66.9	63.0	64.9
Prosper	32	61.7	13.1	63.9	65.1	64.5
LCS Powerplay	32	62.2	13.1	62.5	63.5	63.0
Elgin-ND	35	60.8	14.7	59.5	66.2	62.9
SY Rowyn	29	61.7	14.3	63.2	58.4	60.8
Advance	31	61.7	13.1	60.8	59.3	60.1
Velva	33	59.9	14.3	62.3	57.7	60.0
Barlow	35	63.1	14.4	59.0	60.9	59.9
Glenn	35	64.0	15.6	56.3	58.9	57.6
Forefront	36	61.9	14.7	53.5	59.0	56.3
Select	35	63.3	13.9	56.2	56.0	56.1
SY Soren	30	61.0	14.8	58.2	53.4	55.8
Linkert	29	61.2	14.5	55.1	53.2	54.1
Brennan	28	60.5	15.2	55.5	46.1	50.8
Kelby	32	60.5	15.6	51.2	49.6	50.4
MS Stingray	33	60.4	11.6	--	74.1	--
LCS Iguacu	31	61.9	13.1	--	64.6	--
LCS Breakaway	31	63.2	15.0	--	59.2	--
Prevail	34	61.5	14.3	--	58.3	--
WB Vantage	33	61.4	14.5	--	52.4	--
WB Mayville	29	59.7	14.7	--	48.9	--
Trial Mean	32	61.6	14.1	59.9	59.9	--
C.V.%	3.8	0.6	3.0	7.5	5.8	--
LSD 10%	1	0.4	0.5	5.3	4.1	--

Planting Date: May 28
Planting Rate: 1.25 million PLS/A
Harvest Date: September 11
Previous Crop: 2012 = soybean, 2013 = spring wheat
Soil Type: Gardena silt loam

Hard Red Spring Wheat Variety Trial at Garrison

Cooperator: Mike Zimmerman, Garrison

Variety	Plant Height	Test Weight	Grain Protein	Grain Yield
	inches	lbs/bu	%	bu/A
Faller	36	58.1	9.9	66.1
LCS Albany	33	58.4	9.6	60.9
MS Stingray	34	56.9	8.9	59.1
LCS Iguacu	33	58.6	9.9	57.5
LCS Powerplay	32	57.6	9.8	56.1
Jenna	31	57.6	10.0	54.2
Linkert	29	57.3	12.7	53.4
Forefront	37	57.8	10.8	53.1
Prosper	35	57.5	10.2	51.7
SY Soren	30	57.2	10.7	49.8
LCS Breakaway	31	56.7	11.9	49.0
SY Rowyn	32	57.6	10.5	48.7
Brennan	30	56.7	11.2	48.2
WB Vantage	32	60.1	10.3	46.7
Glenn	37	60.6	11.4	45.5
Barlow	36	56.5	10.8	44.7
Elgin-ND	36	56.9	10.6	44.5
Prevail	32	57.1	10.0	43.4
Advance	32	58.7	9.5	42.8
Velva	34	54.9	10.4	42.3
Kelby	30	57.2	11.6	40.8
WB Mayville	29	54.2	11.6	40.0
Select	34	57.4	9.9	37.2
Trial Mean	33	57.5	10.5	49.4
C.V.%	5.2	0.7	6.1	9.0
LSD 10%	2	0.5	0.8	5.2

Planting Date: April 25
Planting Rate: 1.25 million PLS/A
Harvest Date: August 20
Previous Crop: Sunflower
Soil Type: Williams Bowbells loam

2014 HRSW Variety Trial at Wilton
Cooperator: Rod Binstock, Baldwin

Variety	Plant Height	Test Weight	Grain Protein	Grain Yield		
				2013	2014	2 yr avg
	in	lb/bu	%	bushels per acre		
LCS Albany	36	60.9	12.9	58.9	92.4	75.7
Faller	39	62.0	13.7	59.4	88.8	74.1
Prosper	38	61.6	13.8	60.8	87.3	74.1
LCS Powerplay	36	60.8	13.4	62.6	83.6	73.1
SY Rowyn	35	61.2	13.0	59.2	84.2	71.7
Jenna	35	61.0	14.4	57.2	83.4	70.3
Select	39	61.3	13.8	66.6	73.5	70.1
Advance	38	62.0	13.2	66.4	73.6	70.0
Forefront	41	60.9	14.8	56.2	78.2	67.2
Velva	38	59.5	14.2	68.7	65.5	67.1
SY Soren	33	60.4	14.5	60.7	70.7	65.7
Linkert	33	60.2	14.9	54.9	75.2	65.0
Elgin-ND	40	60.6	13.7	61.3	66.8	64.1
Brennan	33	60.3	14.7	56.0	69.3	62.6
Barlow	38	61.3	14.1	58.6	65.0	61.8
Kelby	34	59.7	14.6	58.5	61.3	59.9
Glenn	39	62.7	15.1	59.1	56.7	57.9
MS Stingray	37	60.3	11.1	--	98.0	--
LCS Breakaway	34	61.2	14.7	--	83.6	--
Prevail	38	60.7	14.0	--	77.1	--
WB Vantage	36	63.2	15.5	--	75.5	--
WB Mayville	31	58.8	14.4	--	73.1	--
LCS Iguacu	37	61.5	12.4	--	71.3	--
Trial Mean	37	61.0	14.0	60.0	76.4	--
C.V.%	3.7	0.6	2.7	4.3	4.2	--
LSD 10%	2	0.4	0.4	3.0	3.8	--

Planting Date: April 25
Planting Rate: 1.25 million PLS/A
Harvest Date: August 28
Previous Crop: 2012 = winter wheat, 2013 = soybean
Soil Type: Williams loam

2014 HRSW in the North Central Region **Combined Means**

Variety	Days to Head	Plant Height	Lodging	Test Weight	Protein	Yield 2013	Yield 2014	Yield 2 Year
	DAP[1]	inches	0-9[2]	lbs/bu	%	----- bushels per acre -----		
LCS Albany	57	34	2	61.5	11.7	63.8	76.5	70.2
MS Stingray	56	36	2	60.0	10.8	61.7	74.3	68.0
Faller	52	36	4	60.4	12.8	63.7	71.6	67.6
Prosper	52	36	3	60.9	12.8	63.6	67.4	65.5
LCS Powerplay	52	34	1	61.0	12.5	61.1	64.4	62.8
SY Rowyn	53	33	0	60.8	12.6	56.5	68.2	62.4
Jenna	56	33	0	60.3	13.2	59.0	64.9	62.0
Advance	54	35	1	61.5	12.3	62.1	60.1	61.1
Elgin-ND	52	38	3	59.5	13.7	59.7	60.6	60.2
Velva	51	36	1	58.4	13.5	61.8	58.3	60.1
LCS Iguacu	54	34	1	61.1	11.7	55.6	62.6	59.1
Select	48	37	2	60.7	13.0	60.9	55.5	58.2
SY Soren	50	31	2	60.0	13.8	57.3	58.6	57.9
LCS Breakaway	52	32	0	61.9	13.4	53.0	62.3	57.7
Barlow	49	36	2	60.6	13.7	57.4	57.9	57.6
Forefront	50	39	0	60.9	13.4	52.7	60.5	56.6
Linkert	51	31	1	59.8	14.1	53.1	58.5	55.8
Glenn	50	37	1	61.8	14.1	54.7	54.7	54.7
Prevail	49	36	2	60.1	13.2	47.3	62.1	54.7
WB Vantage	56	35	0	62.3	13.6	51.5	57.6	54.6
Brennan	51	31	3	59.4	14.0	52.3	55.3	53.8
WB Mayville	50	31	2	58.4	14.0	49.2	55.7	52.5
Kelby	50	33	3	59.3	14.0	50.0	51.9	51.0
# of Locations	2	6	2	6	6	4	6	10

[1] *DAP = Days after planting.* [2] *Lodging: 0 = none, 9 = lying flat on the ground.*

Locations: 2014 = Minot, Minot Late Seeded, Mohall, Rugby, Garrison, Wilton
2013 = Minot, Mohall, Rugby, Wilton

Durum Variety Descriptions

Variety	Agent or Origin[1]	Year Rlsd	Height (in.)	Straw Strength[2]	Days to Heading[3]	Reaction to Disease[4]				
						Stem Rust	Leaf Rust	Foliar Disease	Bact. Leaf Streak	Head Scab
AC Commander	Can.	2002	32	5	68	R	R	MS	NA	NA
AC Napoleon	Can.	2001	40	5	68	R	R	S	NA	NA
AC Navigator	Can.	1999	32	5	66	R	R	M	NA	S
Alkabo	ND	2005	36	2	67	R	R	M	MS	MS
Alzada[5]	WB	2004	30	6	63	R	R	S	NA	VS
Belzer	ND	1997	39	5	66	R	R	M	NA	MR
Ben	ND	1996	39	3	67	R	R	MR	MS	S[6]
CDC Verona	Can.	2010	38	4	69	R	R	MR	NA	S
Carpio	ND	2012	37	5	69	R	R	M	MS/S	M
DG Max	DGP	2008	38	5	66	R	MR	MR	NA	MS
DG Star	DGP	2007	37	4	64	R	R	M	NA	NA
Dilse	ND	2002	37	5	68	R	R	M	M	MS
Divide	ND	2005	38	5	68	R	R	M	MS/S	MR
Grande D'Oro	WB/DGP	2005	37	4	68	R	R	M	NA	NA
Grenora	ND	2005	35	5	67	R	R	M	MS/S	MS
Joppa	ND	2013	39	5	68	R	R	M	MS	MS
Kyle	Can.	1984	39	7	68	R	MR	M	NA	NA
Lebsock	ND	1999	37	3	67	R	R	M	MS	MS
Maier	ND	1998	37	5	67	R	R	M	NA	S[6]
Mountrail	ND	1998	37	5	68	R	R	M	MS	S[6]
Pierce	ND	2001	38	5	67	R	R	MS	MS	S
Plaza	ND	1999	29	7	68	R	R	M	NA	MS
Rugby	ND	1973	38	5	64	R	R	MR	NA	S[6]
Strongfield	Can.	2004	37	6	68	R	R	MS	NA	S
Tioga	ND	2010	39	4	68	R	R	M	MS	MS
VT Peak	Viterra	2010	37	6	68	NA	NA	NA	NA	NA
Wales	WB	2008	36	3	67	R	R	M	NA	S[6]
WB-Belfield	WB	2011	30	2	62	R	R	S	NA	S
Westhope	WB	2009	36	3	67	R	R	MS	NA	S

[1]Refers to agent or developer: Can. = Agriculture Canada, WB = Westbred, ND = North Dakota State University, DGP = Dakota Growers Pasta.

[2] Straw Strength = 1-9, scale with 1 the strongest and 9 the weakest. Based on recent data. These values may change as more data become available.

[3] Days to Heading = the number of days from planting to head emergence from the boot. Averaged from several locations and years.

[4] R = resistant, MR = moderately resistant, M = intermediate, MS = moderately susceptible, S = susceptible, VS = very susceptible, NA = Not adequately tested. Foliar Disease = reaction to tan spot and septoria leaf spot complex.

[5] Alzada has a disease-resistance package that make it more adapted to drier growing conditions (western North Dakota).

[6] Indicates yields and/or quality often have been higher than would be expected based on visual symptoms. NA = Not adequately tested.

Note: Published in NDSU publication A-1067 (revised).

Durum Variety Trial **North Central Research Extension Center—Minot**

Variety	Days to Head	Plant Height	Lodging	Test Weight	Protein	Grain Yield 2012	2013	2014	2 Year	3 Year
	DAP[1]	inches	0-9[2]	lbs/bu	%	bu/A				
Carpio	57	45	4	61.2	12.1	47.8	64.5	68.5	66.5	60.3
Joppa	57	46	4	60.6	12.4	49.0	65.5	66.1	65.8	60.2
Pierce	56	47	1	60.9	12.1	52.6	64.1	63.4	63.7	60.0
Tioga	58	49	2	57.5	11.9	44.4	68.1	66.3	67.2	59.6
Alkabo	56	46	0	60.6	12.3	45.4	56.8	76.0	66.4	59.4
Maier	55	43	1	59.2	13.0	49.4	62.6	62.4	62.5	58.1
Grenora	55	42	1	59.2	12.3	43.8	63.9	65.8	64.9	57.9
Mountrail	56	45	2	59.9	12.2	41.1	61.5	70.5	66.0	57.7
Divide	58	47	1	60.2	12.6	44.1	60.9	66.8	63.8	57.3
Lebsock	55	44	2	60.7	12.1	42.4	59.5	69.5	64.5	57.1
Ben	56	48	2	60.0	13.5	39.2	60.3	68.7	64.5	56.0
Rugby	56	51	3	59.8	13.6	41.6	62.1	61.9	62.0	55.2
Strongfield	57	44	1	58.5	13.2	40.8	58.6	65.8	62.2	55.1
Normanno	56	32	0	55.3	13.3	51.4	56.8	52.5	54.6	53.6
CDC Verona	58	43	0	58.9	12.5	37.7	64.4	58.1	61.2	53.4
AC Commander	57	35	0	58.4	12.5	33.6	64.6	58.8	61.7	52.3
Alzada	54	36	0	58.4	13.3	27.3	59.1	53.0	56.1	46.5
AC Navigator	55	37	0	59.0	12.9	23.9	55.9	54.2	55.0	44.7
VT Peak	56	45	1	60.8	12.5	--	60.4	69.6	65.0	--
MS Dart	58	41	3	58.8	12.1	--	--	58.0	--	--
Trial Mean	57	45	1	59.6	12.7	42.7	61.1	65.1	--	--
C.V.%	1.3	5.3	88	1.3	5.8	8.2	5.1	6.0	--	--
LSD 10%	1	3	1	0.9	1.0	1.6	3.6	4.6	--	--

[1] DAP = Days after planting. *[2] Lodging: 0 = none, 9 = lying flat on the ground.*

Planted on May 16 with a seeding rate of 1.5 million PLS/A and harvested on September 3.

Previous Crop: 2011 & 2012 = field pea, 2013 = soybean.

Soil Type: Williams Loam

2014 Durum Variety Trial at Mohall

Cooperators: Dean Schoenberg and the Renville/Bottineau Ag Improvement Assn.

Variety	Plant Height	Test Weight	Grain Protein	Grain Yield 2013	2014	2 yr avg
	in	lb/bu	%	bushels per acre		
Carpio	41	61.2	13.3	65.7	60.4	63.1
Grenora	39	61.8	12.3	59.9	60.8	60.4
Joppa	42	61.5	12.7	59.9	60.8	60.4
Alkabo	42	63.1	12.1	56.1	64.4	60.2
Mountrail	43	61.8	12.3	62.5	56.7	59.6
Divide	42	62.2	13.4	51.5	60.7	56.1
Trial Mean	42	61.9	12.7	58.6	60.6	--
C.V.%	3.0	0.6	4.3	5.9	5.8	--
LSD 10%	2	0.5	0.7	4.2	4.4	--

Planting Date: May 28

Planting Rate: 1.5 million PLS/A

Harvest Date: September 12

Previous Crop: 2012 = winter wheat, 2013 = canola

Soil Type: Barnes loam

2014 Durum Variety Trial at Rugby
Cooperators: Dave Teigen and the Pierce County Crop Improvement Association

Variety	Plant Height	Test Weight	Grain Protein	Grain Yield
	inches	lb/bu	%	bu/A
Carpio	35	62.3	11.7	48.9
Mountrail	34	61.0	11.9	46.2
Joppa	37	61.6	11.5	45.8
Grenora	34	60.1	12.4	43.9
Divide	37	61.2	11.7	43.5
Alkabo	32	61.7	11.1	40.7
Trial Mean	35	61.3	11.7	44.9
C.V.%	2.7	0.5	3.7	5.0
LSD 10%	1	0.4	0.5	2.8

Planting Date: May 28
Planting Rate: 1.5 million PLS/A
Harvest Date: September 11
Previous Crop: spring wheat
Soil Type: Gardena silt loam

2014 Durum Variety Trial at Garrison
Cooperator: Mike Zimmerman, Garrison

Variety	Plant Height	Test Weight	Grain Protein	Grain Yield		
				2014	2013	2 yr avg
	in	lb/bu	%	bushels per acre		
Alkabo	34	57.2	8.4	49.3	36.8	43.0
Grenora	33	57.7	8.7	45.8	39.8	42.8
Divide	34	57.8	8.2	44.0	37.3	40.6
Joppa	36	57.5	8.5	39.9	34.1	37.0
Mountrail	33	56.6	8.3	34.2	37.7	36.0
Carpio	34	58.7	8.3	39.0	32.4	35.7
Trial Mean	34	57.6	8.4	42.0	35.9	--
C.V.%	5.6	1.0	5.3	6.1	6.2	--
LSD 10%	2	0.7	NS	3.2	2.7	--

NS = no statistical differences between varieties.

Planting Date: April 25
Planting Rate: 1.5 million PLS/A
Harvest Date: August 20
Previous Crop: 2013 = sunflower, 2012 = corn
Soil Type: Williams Bowbells loam

2014 Durum Variety Trial at Wilton
Cooperator: Rod Binstock, Baldwin

Variety	Plant Height	Test Weight	Grain Protein	Grain Yield 2014	Grain Yield 2013	Grain Yield 2 yr avg
	in	lb/bu	%	bushels per		
Mountrail	43	59.4	12.1	80.8	59.7	70.2
Grenora	40	57.9	11.7	78.6	60.4	69.5
Joppa	41	59.0	12.3	80.7	56.3	68.5
Carpio	43	60.2	11.8	77.4	58.8	68.1
Alkabo	41	58.1	12.1	81.6	53.5	67.6
Divide	40	58.9	12.0	78.1	52.6	65.4
Trial Mean	41	58.9	12.0	79.5	57.4	--
C.V.%	3.5	0.9	2.8	5.8	2.5	--
LSD 10%	2	0.7	0.4	NS	1.8	--

NS = no statistical differences between varieties.

Planting Date: April 25
Planting Rate: 1.5 million PLS/A
Harvest Date: August 28
Previous Crop: 2013 = soybean, 2012 = winter wheat
Soil Type: Williams loam

2014 Durum in the North Central Region **Combined Means**

Variety	Days to Head	Plant Height	Lodging	Test Weight	Protein	Average Yield 2013	Average Yield 2014	Average Yield 2 year
	DAP[1]	inches	0-9[2]	lbs/bu	%	----- bushels per acre -----		
Grenora	55	38	1	59.4	11.5	56.0	59.0	57.5
Carpio	57	40	4	60.7	11.4	55.3	58.8	57.1
Alkabo	56	39	0	60.1	11.2	50.8	62.4	56.6
Mountrail	56	40	2	59.7	11.4	55.4	57.7	56.5
Joppa	57	40	4	60.0	11.5	53.9	58.7	56.3
Divide	58	40	1	60.1	11.6	50.6	58.6	54.6
# of Locations	1	5	1	5	5	4	5	9

[1] *DAP = Days after planting.* [2] *Lodging: 0 = none, 9 = lying flat on the ground.*

Locations: 2014 = Minot, Mohall, Garrison, Wilton, Rugby. 2013 = Minot, Mohall, Garrison, Wilton.

Barley Variety Descriptions

Variety	Use[1]	Origin[2]	Year Rlsd	Awn Type[3]	Rachilla Hair Length[4]	Aleurone Color	Height	Straw Strength	Relative Maturity	Reaction to Disease[5] Stem Rust	Spot-form Net Blotch	Spot Blotch	Net Blotch
Six-rowed													
Celebration	M/F	BARI	2008	S	S	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Drummond	M/F	ND	2000	S	L	White	M.short	V.strg.	Med.	S	MR	MR/R	MS/S
Innovation	MT	BARI	2009	S	L	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Lacey	M/F	MN	1999	S	S	White	M.short	Strg.	Med.	S	MR	MR/R	MS/S
Legacy	M/F	BARI	2000	S	L	White	Med.	Strg.	M.late	S	MS	MR/R	MS/S
Quest[6]	M/F	MN	2010	S	L	White	M.short	V.strg.	Med.	S	MR	MR/R	MS/S
Rasmusson	M/F	MN	2008	S	S	White	M.short	Strg.	Med.	S	MS	MR/R	MS/S
Robust	M/F	MN	1983	S	S	White	Med.	M.strg.	Med.	S	MS/S	MR/R	MS/S
Stellar-ND	M/F	ND	2005	S	L	White	M.short	V.strg.	Med.	S	MS	MR/R	MS/S
Tradition	M/F	BARI	2003	S	L	White	M.short	V.strg.	Med.	S	MS	MR/R	MS/S
Two-rowed													
AC Metcalfe	M	Can	1997	R	L	White	Med.	Med.	Late	S	MS	MS	MS
CDC Copeland	M	Can	1999	R	L	White	Tall	Med.	Late	S	MS	MS	MR
Conlon[7]	M/F	ND	1996	S	L	White	M.short	Med.	M.Early	S	MR	MS	MR/R
Conrad	M	BARI	2007	R	L	White	Tall	M.weak	Late	S	MS	NA	NA
Eslick	F	MT	2003	R	L	White	Med.	M.weak	M.late	S	NA	MS	NA
Harrington[8]	F	Can	1981	R	L	White	Med.	M.weak	Late	S	S	S	MS
Haxby	F	MT	2003	R	L	White	Med.	Med.	Med.	S	MS	MS	NA
Hockett	M/F	MT	2008	R	L	White	Med.	Med.	Med.	S	NA	NA	NA
Lilly	F	G	NA	R	L	White	Short	M.strg.	Late	S	MS/S	S	MR/R
Pinnacle	M/F	ND	2006	S	L	White	Med.	Strg.	M.late	S	S	MR	MS
Rawson	F	ND	2005	R	L	White	Med.	Med.	Med.	S	MS	MR	MS
Scarlett	M	G	1995	R	L	White	Short	Med.	Late	S	NA	S	MR
Sunshine	F	G	NA	R	L	White	Short	M.strg.	Late	S	S	S	MS
Specialty													
Wanubet	SP	MT	1990	H	L	White	Med.	Weak	Late	S	NA	S	S

[1] M = malting, MT = Being tested in plant-scale tests for malting and brewing quality, F = feed, SP = special uses (hull-less).

[2] BARI = Busch Agricultural Resources Inc., Can = Canada, G = Germany, MN = University of Minnesota, MT = Montana State University, ND = North Dakota State University.

[3] R = rough, S = smooth, H = hull-less.

[4] S = short, L = long.

[5] R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, NA = not available.

[6] Moderately resistant to Fusarium head blight.

[7] Lower DON accumulations than other varieties tested.

[8] Recommended as a malting barley in western U.S.

Note: Published in NDSU publication A-1049 (revised).

2014 Barley Variety Trial **North Central Research Extension Center—Minot**

Variety	Days to Head	Plant Height	Lodging	% Plump	% Thin	Test Weight	Protein	Grain Yield 2011	2013	2014	2 Year	3 Year
	DAP[1]	inches	0-9[2]	>6/64	<5/64	lbs/bu	%	bu/A				
6 Row Types												
Quest	52	38	1	96	0.9	45.0	12.6	59.5	71.2	99.5	85.4	76.7
Lacey	52	36	1	98	0.8	46.7	14.0	60.2	73.6	93.2	83.4	75.7
Innovation	51	35	0	98	0.6	45.3	13.8	47.8	85.8	90.2	88.0	74.6
Stellar-ND	52	37	0	98	0.8	44.9	13.8	43.2	75.7	97.5	86.6	72.1
Celebration	52	37	1	99	0.8	48.1	15.2	52.3	66.9	96.7	81.8	72.0
Tradition	51	37	0	98	0.6	46.7	13.8	55.6	68.3	87.9	78.1	70.6
2 Row Types												
Genesis	56	38	0	98	0.6	46.5	11.0	68.0	77.7	101.0	89.4	82.2
CDC Copeland	57	42	2	98	0.8	46.5	11.7	46.7	81.4	100.7	91.1	76.3
Pinnacle	54	39	0	98	1.0	45.0	10.9	44.1	73.5	94.4	83.9	70.7
Conlon	51	35	0	99	0.6	49.8	12.5	49.8	62.3	93.7	78.0	68.6
Conrad	58	35	0	96	1.1	46.6	13.1	43.0	71.8	90.5	81.2	68.4
AC Metcalfe	57	38	1	97	0.9	46.7	12.8	45.7	69.7	88.2	79.0	67.9
Rawson	51	36	1	98	0.8	46.7	12.7	43.8	62.8	89.3	76.1	65.3
Trial Mean	53	37	0	98	1.0	46.5	12.9	48.4	77.4	97.1	--	--
C.V.%	1.7	5.8	190	1.4	49	2.8	5.3	8.3	6.2	5.7	--	--
LSD 10%	1	3	NS	2	NS	1.5	0.8	8.0	5.7	6.5	--	--

[1] DAP = Days after planting. *[2] Lodging: 0 = none, 9 = lying flat on the ground.*

NS = no statistical difference between varieties.

Planted on May 16 with a seeding rate of 1 million PLS/A and harvested on August 29.

Previous Crop: 2010 = summer fallow, 2012 = field pea 2013 = soybean.

Soil Type: Williams Loam

Note: 2012 trial data not reported due to severe herbicide injury.

2014 Barley Variety Trial at Mohall

Cooperators: Dean Schoenberg and the Renville/Bottineau Ag Improvement Association

Variety	Plant Height	% Plump	% Thin	Test Weight	Protein	Grain Yield 2013	2014	2 yr avg
	inches	>6/64	<5/64	lbs/bu	%	bushels per acre		
6 Row								
Innovation	31	98	0	48.9	13.3	62.7	69.9	66.3
Quest	34	98	0	47.3	13.0	56.5	69.3	62.9
Lacey	32	98	0	49.5	13.0	58.6	66.1	62.4
Tradition	31	98	0	48.8	13.1	54.3	70.2	62.2
Celebration	30	98	0	48.1	13.5	58.0	62.2	60.1
Stellar-ND	31	99	0	48.1	12.5	55.3	63.1	59.2
2 Row								
Genesis	32	98	0	47.8	10.8	--	71.1	--
Conlon	31	99	0	50.2	12.5	54.6	61.1	57.9
Pinnacle	31	98	0	48.9	11.3	38.2	77.3	57.7
Trial Mean	31	98	0	48.5	12.5	55.2	68.5	--
C.V.%	5.1	0.8	--	1.3	2.5	6.6	3.9	--
LSD 10%	2	NS	NS	0.7	0.4	4.6	3.2	--

NS = no statistical difference between varieties.

Planting Date: May 28

Planting Rate: 1 million PLS/A

Harvest Date: September 12

Previous Crop: 2012 = Winter wheat, 2013 = canola.

Soil Type: Barnes loam

2014 Barley Variety Trial at Rugby
Cooperators: Dave Teigen and the Pierce County Crop Improvement Association

Variety	Plant Height	% Plump	% Thin	Test Weight	Protein	Yield
	inches	>6/64	<5/64	lbs/bu	%	bu/A
6 Row Types						
Quest	34	93	1	47.3	14.2	67.1
Stellar-ND	31	96	0	48.2	13.7	63.1
Innovation	29	97	0	49.1	13.9	60.9
Celebration	29	94	1	47.3	14.5	46.0
Lacey	31	96	0	49.0	13.5	45.8
Tradition	28	96	0	47.8	13.8	43.4
2 Row Types						
Genesis	33	97	0	48.9	11.6	49.4
Pinnacle	33	97	0	48.8	12.8	56.2
Conlon	28	94	1	50.2	14.9	*
Trial Mean	31	96	1	48.5	13.5	51.7
C.V.%	3.6	1.7	61	1.0	3.1	7.3
LSD 10%	1	2	NS	0.6	0.5	4.6

NS = no statistical difference between varieties.
**Yield not reported due to bird damage.*

Planting Date: May 28
Planting Rate: 1 million PLS/A
Harvest Date: September 11
Previous Crop: spring wheat
Soil Type: Gardena silt loam

2014 Barley Variety Trial at Garrison
Cooperator: Mike Zimmerman, Garrison

Variety	Plant Height	% Plump	% Thin	Test Weight	Protein	Yield
	inches	>6/64	<5/64	lbs/bu	%	bu/A
6 Row Types						
Celebration	32	97	0	49.4	9.5	62.0
Tradition	33	98	0	50.9	10.0	58.4
Lacey	30	97	0	49.1	9.4	48.3
Stellar-ND	31	97	1	47.6	8.7	44.6
Quest	31	92	1	48.3	8.7	43.5
Innovation	26	97	0	48.3	9.0	43.2
2 Row Types						
Conlon	28	99	0	51.7	8.8	54.8
Genesis	34	97	0	50.6	9.2	50.2
Pinnacle	31	98	0	49.6	8.1	43.8
Trial Mean	30	97	0	49.4	9.0	49.4
C.V.%	4.2	0.7	--	0.8	3.9	5.3
LSD 10%	2	1	NS	0.5	0.4	3.1

NS = no statistical difference between varieties.

Planting Date: April 25
Planting Rate: 1 million PLS/A
Harvest Date: August 20
Previous Crop: sunflower
Soil Type: Williams Bowbells loam

2014 Barley Variety Trial at Wilton
Cooperator: Rod Binstock, Baldwin

Variety	Plant Height	% Plump	% Thin	Test Weight	Grain Protein	Grain Yield 2013	Grain Yield 2014	Grain Yield 2 yr avg
	inches	>6/64	<5/64	lbs/bu	%	---- bushels per acre ----		
6 Row Types								
Celebration	34	98	0	48.8	11.9	74.0	84.2	79.1
Innovation	34	99	0	48.6	12.5	73.2	81.7	77.5
Tradition	36	98	0	50.7	13.1	73.4	81.3	77.3
Stellar-ND	33	99	0	47.1	12.4	70.7	81.9	76.3
Lacey	35	99	0	49.9	12.5	66.2	84.6	75.4
Quest	34	95	1	49.1	11.8	63.0	83.8	73.4
2 Row Types								
Genesis	34	98	1	48.4	11.1	--	70.6	--
Pinnacle	33	99	1	50.2	10.3	73.0	73.1	73.1
Conlon	31	98	1	51.1	13.3		46.0	
Trial Mean	34	98	0	49.3	12.0	71.5	77.1	--
C.V.%	3.9	0.6	--	0.8	2.7	5.6	6.0	--
LSD 10%	2	1	NS	0.5	0.4	4.9	5.6	--

NS = no statistical difference between varieties.

Planting Date: April 25
Planting Rate: 1 million PLS/A
Harvest Date: August 28
Previous Crop: 2012 = Winter wheat, 2013 = soybean.
Soil Type: Williams loam

2014 Barley in the North Central Region **Combined Means**

Variety	Days to Head	Plant Height	Lodging	% Plump	% Thin	Test Weight	Protein	Yield 2013	Yield 2014	Yield 2 Year
	DAP[1]	inches	0-9[2]	>6/64	<5/64	lbs/bu	%	bushels per acre		
6 Row Types										
Innovation	51	31	0	98	0	48.0	12.5	73.9	69.2	71.5
Stellar-ND	52	33	0	98	0	47.2	12.2	67.2	70.0	68.6
Celebration	52	32	1	97	0	48.3	12.9	66.3	70.2	68.3
Quest	52	34	1	94	1	47.4	12.1	63.6	72.6	68.1
Lacey	52	33	1	98	0	48.8	12.5	66.1	67.6	66.9
Tradition	51	33	0	98	0	49.0	12.8	65.3	68.2	66.8
2 Row Types										
Pinnacle	54	33	0	98	1	48.5	10.7	61.6	69.0	65.3
Conlon	51	30	0	98	0	50.6	12.4	58.4	63.9	61.2
# of Locations	1	5	1	5	5	5	5	3	5	8

[1] *DAP = Days after planting.* [2] *Lodging: 0 = none, 9 = lying flat on the ground.*

Locations: 2014 = Minot, Mohall, Rugby, Garrison, Wilton. 2013 = Minot, Mohall, Wilton.

Oat Variety Descriptions

Variety	Origin[1]	Year Rlsd	Grain Color	Height	Straw Strength	Mat[2]	Reaction to Diseases: Stem Rust[3]	Reaction to Diseases: Crown Rust[3]	Reaction to Diseases: Barley Y.Dwf[4]	Bu/Wt.	Protein[5]
AAC Justice	**Can.**	**2015**	**White**	**Tall**	**Strong**	**L**	**S**	**R**	**NA**	**Good**	**NA**
AC Assiniboia	CPS	1997	Red	Med	Strong	L	S	S	T	Good	M/L
AC Kaufman	Can.	2000	Yellow	Tall	Strong	L	S	S	MT	V.good	M/L
AC Pinnacle	CQAS	1999	White	Tall	Med.	L	S	S	S	V.good	L
Beach	ND	2004	White	Tall	M.strg.	M/L	S	MR/MS	MS	V.good	M
Buff	SD	2002	Hull-less	Med.	M.strg.	L	S	MR/MS	MT	Good	H
CDC Dancer	CC	2000	White	Tall	Strong	L	S	MS	S	V.good	M
CDC Minstrel	Sask.	2006	White	Tall	M.strg.	L	S	S	S	Good	M
CDC Weaver	Can.	2005	Yellow	Med.	M.strg.	L	S	S	S	Good	M
Deon	**MN**	**2013**	**Yellow**	**Tall**	**Strong**	**L**	**S**	**R**	**T**	**V.good**	
Furlong	AW	2003	Red	Tall	M.strg.	L	S	S	T	V.good	M
Goliath	**SD**	**2013**	**White**	**Tall**	**Med.**	**L**	**NA**	**MR/MS**	**NA**	**Good**	**M**
HiFi	ND	2001	White	Tall	Strong	L	MR/MS	S	T	Good	M
Horsepower	SD	2012	White	Short	Strong	E/M	MS	S	MT	V.good	M/H
Hytest	SD	1986	White	Tall	M.strg.	E	S	MS	S	V.good	H
Jury	ND	2012	White	Tall	M.strg.	M	R	S	MT	V.good	M
Killdeer	ND	2000	White	Med.	Strong	M	S	MS	MT	Good	M
Leggett	AW	2005	White	Tall	Strong	L	MR	R	S	Good	M
Loyal	SD	2000	Ivory	Tall	M.strg.	L	S	MR	T	Good	M/H
Maida	ND	2005	Yellow	Med.	Strong	M	R	S	MS	V.good	M/H
Morton	ND	2001	White	Tall	V.strg.	L	S	S	MT	V.good	M
Newburg	ND	2011	White	Tall	Med.	L	R	S	MT	Good	M
Otana	MT	1977	White	M.tall	M.weak	L	S	S	S	V.good	M/L
Paul	ND	1994	Hull-less	V.tall	Strong	L	R	MR/MS	T	Good	H
Rockford	ND	2008	White	Tall	Strong	L	S	S	MT	V.good	M
Sesqui	MN	2001	Yellow	M.tall	Strong	L	S	S	T	Good	M
Shelby 427	SD	2008	White	Med.	Strong	E	S	S	NA	V.good	NA
Souris	ND	2006	White	Med.	Strong	M	MS	S	MS	V.good	M
Stallion	SD	2006	White	Tall	Med.	L	S	MR	NA	V.good	M
Stark	ND	2004	Hull-less	Tall	M.strg.	L	R	MR/MS	T	V.good	M
Streaker	SD	2008	Hull-less	Tall	M.weak	M	S	R/MR	NA	V.good	M/H
Summit	AW	2008	White	Med.	Strong	L	S	S	MT	Good	M

[1] Can = Canada, ND = North Dakota State University, SD = South Dakota State University, MT = Montana State University, Sask. = Saskatchewan, CPS = Can. Proven Seed, CC = Can. Cargill, AW = AAFC Winnipeg, CQAS = Can. QAS, MN = Minnesota.

[2] E = early, M = medium, L = late.

[3] R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

[4] Barley Yellow Dwarf Virus, S = susceptible, MS = moderately susceptible, MT = moderately tolerant, T = tolerant, NA = not available. Varieties rated MT or T have a relatively good degree of protection against barley yellow dwarf virus.

[5] H = high, M = medium, L = low.

Bolded Varieties are new releases.

Note: Published in NDSU publication A-1049 (revised).

2014 Oat Variety Trial **North Central Research Extension Center—Minot**

Variety	Days to Head	Plant Height	Lodging	Test Weight	Grain Yield 2012	2013	2014	2 Year	3 Year
	[1]DAP	inches	[2]0-9	lb/bu	----------bu/A----------				
Stallion	57	49	0	37.0	167.9	86.2	174.1	130.1	142.7
Newberg	56	53	0	39.1	152.1	127.2	144.3	135.8	141.2
Souris	57	56	4	38.0	144.8	111.2	135.8	123.5	130.6
CDC Dancer	58	51	0	37.3	136.4	107.8	147.2	127.5	130.5
Horsepower	57	54	1	38.1	135.2	110.9	145.1	128.0	130.4
Jury	55	52	0	37.7	126.1	128.4	136.3	132.4	130.3
Leggett	61	56	0	35.9	123.6	117.5	148.5	133.0	129.9
Rockford	60	60	2	38.5	143.1	116.4	123.9	120.1	127.8
CDC Minstrel	63	55	0	34.3	139.5	82.4	157.4	119.9	126.4
AC Pinnacle	61	56	0	36.9	146.1	98.8	132.8	115.8	125.9
Killdeer	55	53	0	37.4	144.1	100.6	129.6	115.1	124.8
Beach	58	52	0	40.3	135.6	79.3	159.3	119.3	124.7
HiFi	57	55	2	37.1	141.7	114.3	111.7	113.0	122.6
Furlong	57	55	1	37.4	121.8	88.3	143.1	115.7	117.7
Hytest	56	51	1	38.6	130.3	60.9	142.6	101.7	111.2
Otana	55	54	1	35.8	134.5	60.8	120.1	90.4	105.1
Goliath	60	55	0	38.0	--	96.9	115.8	106.3	--
Deon	59	53	0	37.3	--	--	159.9	--	--
Paul	62	51	1	41.6	--	--	111.8	--	--
Trial Mean	59	54	1	37.3	136.6	104.8	137.8	--	--
C.V.%	1.5	4.7	155	2.1	7.4	7.4	6.4	--	--
LSD 10%	1	3	1	0.9	10.7	9.1	10.3	--	--

[1] DAP = Days after planting. *[2] Lodging: 0 = none, 9 = lying flat on the ground.*

Planted on May 16 with a seeding rate of 1 million PLS/A and harvested on September 3.

Previous Crop: 2011 = summer fallow, 2012 = durum, 2013 = soybean.

Soil Type: Williams Loam

Hard Winter Wheat Variety Descriptions

Variety	Agent or Origin[2]	Year	Reaction to Disease[1] Stripe Rust	Leaf Rust	Stem Rust	Scab	Maturity[3]	Straw[4] Strength	Height[5] (inches)	Winter[6] Hardiness
AAC Gateway	A.Can.	2012	R	MR/MS	R	MS	0	3	30	3
Accipiter	CDC	2008	NA	MS	R	S	-2	4	36	2
Alice[7]	SD	2006	NA	S	MR	S	-4	5	33	5
Art	Agripro	2008	R	R	R	MS	-6	4	33	8
Boomer	WB	2009	MS	MR	R	S	-2	4	34	3
Broadview	A.Can.	2008	MS	R	R	S/VS	-2	5	32	4
Carter	WB	2010	S	NA	NA	S	-2	4	32	6
CDC Falcon	WB	2000	MS	MS	NA	S	-2	5	34	4
Darrell	SD	2006	NA	S	R	MS	-4	4	35	6
Decade	MT/ND	2010	S	VS	R	VS	-4	4	35	2
Emerson	A.Can.	2011	R	MS	R	MR	-2	4	33	3
Flourish	A.Can.	2010	MR	MS	MS	S	-4	5	35	2
Freeman	ARS-NE	2013	MR/S	MR/MS	MR/MS	MS	-5	4	33	6
Hawken	Agripro	2007	S	MR	MR	S	-5	4	28	7
Ideal	SD	2011	NA	R	MR	S	-3	5	33	5
Jagalene	Agripro	2002	MS	S	MR	VS	-4	4	33	6
Jerry	ND	2001	MR	MR	R	S	0	4	37	3
Lyman	SD	2008	MS	R	R	MR	-4	7	35	5
McGill	ARS-NE	2010	MS	MS	MR	MS	-5	4	36	4
Millennium	NE/SD	1999	MR	MR	MR	S	-4	4	37	6
Moats	A. Can.	2010	NA	R	R	MR	0	5	38	2
Overland	NE	2006	MR	MR/R	MR	S	-4	4	35	5
Peregrine	CDC	2008	R	MR	R	MS	+1	4	39	2
Radiant[8]	A. Can.	2001	R	S	S	S	+1	2	36	2
Robidoux	ARS-NE	2010	MR	MS	MR	S	-3	4	34	6
Roughrider	ND	1975	NA	S	R	MS	0	5	42	2
Smoky Hill	WB	2007	S	R	R	S	0	5	35	7
Striker	WB	2009	MS	MR	R	S	-4	4	32	5
SY Wolf	Agripro	2010	MS	MR	R	MS	-4	4	33	6
WB Grainfield	WB	2013	MS	MS	NA	S	-5	6	33	6
WB Matlock	WB	2010	MS	MS	R	MS	+1	4	36	2
Wesley	NE/SD/WY	2000	MR	MS	R	S	-5	5	32	6
Yellowstone	MT	2005	R	S	S	VS	+2	6	33	5

[1] R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible, NA = not available.

[2] A.Can. = Agriculture and Agri-Food Canada, CDC = Crop Development Centre:University of Saskatchewan, WB = WestBred, SD = South Dakota State University, MT = Montana State University, ND = North Dakota State University, ARS = USDA Agricultural Research Service, NE = University of Nebraska, WY = Wyoming.

[3] Days to heading relative to Jerry.

[4] Straw strength = 1 to 9 scale, with 1 strongest and 9 weakest. These ratings may change as additional data become available.

[5] Based on the average of several environments, and should be used for comparing varieties. The environment can impact the height of varieties.

[6] Relative winter hardiness rating: 1 = excellent, 10 = very poor. These values are subject to change as additional information becomes available.

[7] White wheat.

[8] Curl Mite Resistant.

Note: Published in NDSU publication A-1196 (revised).

2014 Winter Wheat Variety Trial at Minot **North Central Research Extension Center—Minot**
Cooperator: Steve Dvorak, Ducks Unlimited

	Test Weight		Protein		Yield		2 yr avg Yield		3 yr avg Yield	
Variety	fung*	no fung	fung	no fung	fung	no fung	fung	no fung	fung	no fung
	lbs/bu		%		bu/A		bu/A		bu/A	
Accipiter	61.6	58.5	12.1	11.7	68.9	56.9	92.4	74.9	96.8	82.4
WB-Matlock	61.2	59.7	13.4	13.0	73.9	57.8	92.9	75.1	94.3	79.4
AC Broadview	60.0	56.9	12.2	12.1	72.5	55.7	93.7	77.3	94.1	84.9
Redfield	60.5	58.8	13.3	12.5	62.6	54.9	91.0	76.7	92.6	82.1
Decade	58.8	55.4	13.0	13.2	69.8	47.3	90.9	78.2	92.4	79.6
CDC Falcon	60.4	57.0	12.5	11.8	63.1	59.5	89.8	76.6	91.6	81.1
Ideal	60.2	59.9	12.6	12.7	68.4	63.8	91.9	84.4	91.2	88.7
Peregrine	61.1	60.2	11.8	12.3	69.7	64.2	85.5	80.7	88.9	86.3
Jerry	60.4	60.1	13.4	12.6	64.3	64.6	83.8	77.6	86.7	82.8
Robidoux	59.4	56.6	12.8	12.4	66.5	47.7	85.7	63.4	86.2	70.7
SY Wolf	57.9	55.9	12.7	12.7	62.8	48.0	87.2	71.4	86.0	76.7
Darrell	60.6	58.9	12.2	12.8	68.1	58.2	87.1	78.9	85.7	80.5
McGill	59.7	58.7	12.1	12.2	74.3	51.0	86.6	67.5	85.2	71.1
Art	59.9	57.7	12.8	13.2	58.7	48.9	83.3	73.9	83.5	79.1
Lyman	60.2	59.5	14.6	13.1	68.2	63.6	85.6	81.0	83.2	84.0
Overland	60.1	58.7	13.1	12.5	61.1	55.7	82.0	77.3	80.6	77.1
Freeman	59.2	56.1	12.6	12.7	62.5	56.2	87.5	81.2	--	--
AC Flourish	59.9	55.6	12.7	12.2	64.8	49.5	88.8	75.1	--	--
WB-Grainfield	60.2	55.5	12.5	12.5	55.7	48.7	79.2	75.0	--	--
CDC Moats	61.6	60.1	12.5	12.3	64.7	51.8	90.8	74.3	--	--
WB-Redhawk	58.4	54.5	12.9	12.9	61.5	42.0	84.2	74.0	--	--
NORD 1302	60.5	57.8	12.2	12.0	48.0	60.2	--	--	--	--
NORD 1301	60.4	58.4	13.1	12.4	60.2	59.6	--	--	--	--
AC Emerson	60.3	59.5	13.1	12.8	65.8	57.7	--	--	--	--
AC Radiant	58.4	58.6	12.6	11.9	73.8	54.7	--	--	--	--
AAC Gateway	59.3	57.2	13.4	13.0	59.0	50.4	--	--	--	--
SY Clearstone	58.0	54.2	12.4	12.6	65.6	49.5	--	--	--	--
War Horse	58.9	56.3	13.7	13.4	59.5	47.4	--	--	--	--
Coulter	55.7	52.3	13.4	12.1	64.2	44.1	--	--	--	--
Trial Mean	59.8	57.5	12.8	12.5	64.7	54.1	--	--	--	--
C.V.%	1.9	1.7	4.4	4.1	11.6	11.1	--	--	--	--
LSD 10%	1.5	1.3	0.8	1.1	10.3	8.2	--	--	--	--

**Foliar fungicide: 8.2 oz/A Prosaro applied on July 2.*

Planting Date: September 25
Planting Rate: 1.3 million PLS/A
Harvest Date: August 20
Previous Crop: 2013 = prevent plant, 2012 = durum, 2011 = prevent plant.
Soil Type: Williams loam

2014 Hybrid Grain Corn Trial **North Central Research Extension Center—Minot**

Company/Brand	Hybrid	Relative Maturity	Days to Silk	Ear Height	Harvest Moisture	Test Weight	Grain Yield				
							2012	2013	2014	2 Year	3 Year
		days	DAP**	inches	%	lbs/bu	bu/A				
Agventure	RL1131AM	76	69	42	21.6	55.2	--	121	145	133	--
Agventure	RL1742HB	79	69	39	21.8	56.5	--	--	137	--	--
Agventure	RL2106YHB	81	70	44	25.0	58.1	--	112	134	123	--
Agventure	RL2289YHB	82	70	40	22.5	55.5	--	--	164	--	--
Agventure	GL2949ABW	85	71	43	23.2	55.7	--	112	162	137	--
Blue River Hybrids	09R19	79	70	38	23.0	58.0	--	--	136	--	--
Channel	180-18VT2PRIB	80	71	42	19.8	56.6	--	124	130	127	--
Channel	181-92VT2PRIB	81	70	40	19.1	55.7	--	127	150	138	--
Channel	182-62VT2PRIB	82	70	41	22.0	58.5	--	--	135	--	--
Dyna-Gro Seed	D18VC61	78	70	42	18.5	56.6	--	--	145	--	--
Dyna-Gro Seed	D19VC89	79	70	44	18.3	57.0	--	--	152	--	--
Dyna-Gro Seed	D21VC68	81	71	43	22.9	57.0	--	--	138	--	--
Integra	2803	78	70	42	19.0	56.0	--	126	140	133	--
Integra	9301	80	70	39	21.3	58.0	77	115	140	128	111
Integra	9302	80	71	41	20.5	56.6	--	94	128	111	--
Integra	3142	81	71	40	19.2	57.3	--	--	155	--	--
Integra	9333	83	71	44	21.0	59.2	84	135	133	134	117
Legacy Seeds	L1713 VT2Pro	78	70	43	19.0	56.2	--	--	140	--	--
Legacy Seeds	L1814 VT2Pro	79	71	43	18.1	56.3	--	--	147	--	--
Legacy Seeds	L1943 VT2Pro	81	70	40	18.7	55.0	--	--	142	--	--
Legacy Seeds	L2213 VT2Pro	82	68	37	19.9	56.7	--	--	163	--	--
Legacy Seeds	L2314 VT2Pro	83	71	42	22.1	56.3	--	--	145	--	--
Legend Seeds	LR 9475 RR	75	71	39	22.7	57.6	--	--	158	--	--
Legend Seeds	LR 9279 VT2PRIB	79	72	42	22.7	59.2	--	--	148	--	--
Legend Seeds	LR 9482 VT2PRIB	82	72	42	22.0	56.0	--	--	146	--	--
Legend Seeds	LR 9583RR	83	71	44	24.7	57.8	--	--	143	--	--
Nuseed	2754 GT	75	70	41	20.9	55.3	--	--	116	--	--
Nuseed	2771 GT	77	70	41	20.6	53.7	103	129	139	134	124
Nuseed	2774 GTCBLL	77	70	39	18.3	55.6	--	--	137	--	--
Nuseed	8001 VT2P	80	70	38	21.3	56.9	--	105	142	124	--
Nuseed	8202 VP3220	82	73	44	25.0	56.1	--	111	143	127	--
NuTech	5N-183	83	73	44	23.3	55.7	101	142	168	155	137
NuTech/G2 Genetics	3F-775	75	68	40	19.2	54.3	--	--	154	--	--
NuTech/G2 Genetics	X5Z-7702	77	68	39	21.1	57.9	--	--	140	--	--
NuTech/G2 Genetics	X5H-7802	78	69	39	20.9	55.5	--	--	136	--	--
NuTech/G2 Genetics	5Z-379	79	69	43	21.1	54.5	--	--	154	--	--
NuTech/G2 Genetics	3F-781	81	71	44	21.4	53.3	--	--	144	--	--
Peterson Farms Seed	PFS 71N78	78	68	40	20.5	57.5	--	108	131	120	--
Peterson Farms Seed	PFS 71C80	80	70	37	21.3	58.3	77	100	139	120	105
Peterson Farms Seed	PFS 71D83	83	70	41	18.6	56.1	--	--	134	--	--
Peterson Farms Seed	PFS 98E84	84	75	41	18.3	52.4	--	--	150	--	--
Proseed	1280 VT2P	80	70	39	20.7	57.5	--	121	135	128	--
Proseed	1378 VT2P	78	69	40	19.7	56.5	--	--	127	--	--
Proseed	1182 GTCBLL	82	73	43	23.6	55.4	89	131	145	138	122
Proseed	1283 VT2P	83	69	40	23.3	57.5	--	124	126	125	--
Proseed	1383 GT	83	73	40	19.0	53.7	--	--	155	--	--

2014 Hybrid Grain Corn Trial Continued **North Central Research Extension Center—Minot**

Company/Brand	Hybrid	Relative Maturity	Days to Silk	Ear Height	Harvest Moisture	Test Weight	Grain Yield 2012	2013	2014	2 Year	3 Year
		days	DAP**	inches	%	lbs/bu	bu/A				
Proseed	1083 GT3000	83	72	39	25.0	54.0	100	147	167	157	138
REA Hybrids	1B730-RIB	73	66	39	19.3	60.0	--	--	97	--	--
REA Hybrids	1B102-RIB	76	69	41	22.2	57.7	--	128	126	127	--
REA Hybrids	1B770-RIB	77	67	38	20.3	58.4	--	--	113	--	--
REA Hybrids	1B790-RIB	79	69	43	19.4	57.5	--	--	145	--	--
REA Hybrids	1B801-RIB	80	71	43	18.2	55.5	--	107	152	130	--
REA Hybrids	1B820-RIB	82	70	40	20.6	56.3	--	--	146	--	--
Thunder Seed	4578 RR	78	70	42	19.5	56.2	--	123	137	130	--
Thunder Seed	5181RR	81	71	40	18.9	54.7	--	--	142	--	--
Thunder Seed	6180 VT2P	80	70	39	21.7	58.6	--	--	124	--	--
Thunder Seed	4377 RR	77	71	38	22.6	56.5	--	121	153	137	--
Thunder Seed	6382 VT2P	82	72	42	23.9	57.6	--	136	137	136	--
Thunder Seed	4383 VT2P	83	69	40	21.1	56.7	--	112	147	130	--
Thunder Seed	6385 VT2P	85	70	39	21.5	58.0	--	--	131	--	--
Thunder Seed	7188 VT2P	88	73	45	28.5	55.3	--	--	150	--	--
Wensman Seed	W 8076VT2RIB	79	68	38	20.8	58.1	--	136	133	134	--
Wensman Seed	W 80809VT2PRO	80	71	41	19.4	56.4	--	--	148	--	--
Wensman Seed	W 80827VT2PRO	82	71	44	19.6	55.7	--	127	138	132	--
Wensman Seed	W 8083VT2RIB	82	70	43	22.3	59.2	--	120	152	136	--
Wensman Seed	W 80841VT2RIB	84	71	44	20.4	56.7	--	--	130	--	--
Trial Mean			70	41	21.1	56.5	86	123	141	--	--
C.V.%			1.8	6.5	12.0	4.0	7.9	10.0	5.4	--	--
LSD 10%			1	3	3.0	2.6	8	14	9	--	--

**Growing Degree Units to Black Layer.* ***DAP = Days after planting.*

Planting Date: May 22
Plant Population: 26,000 Plants/A
Row Spracing: 30"
Harvest Date: October 22
Soil Type: Williams Loam
Previous Crop: 2011 = summer fallow, 2012 = HRSW, 2013 = Barley
Note: Test weights and yields are adjusted to 15.5% moisture.

2014 Non-GMO Hybrid Grain Corn Trial **North Central Research Extension Center—Minot**

Company/Brand	Hybrid	GDU's	Relative Maturity	Days to Silk	Ear Height	Harvest Moisture	Test Weight	Grain Yield
		*	days	DAP**	inches	%	lbs/bu	bu/A
Oseva Bzenee	Pyroxenia		73	65	31	18.4	57.8	78
HR Smolice	Kosynier		82	67	33	20.0	58.7	124
Blue River Hybrids	06M21	1850	77	70	41	17.6	53.2	127
Blue River Hybrids	07R41	1870	78	72	42	26.0	56.2	97
Blue River Hybrids	07M91	1915	79	71	40	19.0	53.3	123
Blue River Hybrids	14A91	1935	82	72	38	19.6	51.7	123
Trial Mean				69	37	20.1	55.2	112
C.V.%				1.1	10.8	12.2	2.2	4.5
LSD 10%				1	5	3.0	1.5	6

**Growing Degree Units to Black Layer.* ***DAP = Days after planting.*

Planting Date: May 22 *Row Spracing: 30"*
Plant Population: 26,000 Plants/A
Harvest Date: October 23 *Soil Type: Williams Loam*
Note: Test weights and yields are adjusted to 15.5% moisture.

2014 Silage Corn Variety Trial—Minot

Company	Hybrid	Relative Maturity	Days to Silk	Harvest Moisture	Yield 65% moist
			DAP[1]	%	tons/A
Thunder Seed	7993 VT2P	93	75	64	12.13
Dairyland Seed	HiDF-3702-9	102	81	62	16.11
NuTech/G2 Genetics	5Y-196	96	73	59	16.92
NuTech Seed	5N-183	83	72	59	15.21
NuTech Seed	5B-186	86	73	59	13.83
NuTech Seed	5B-290	90	75	58	15.65
Integra	STP 7897	97	78	59	15.61
Integra	STPX95	95	83	59	16.43
Integra	STPX102	102	82	59	17.04
Legacy Seeds	L3043 VT2Pro	93	76	59	18.13
Grain Check	GL2949ABW	85	72	66	13.95
Trial Mean			76	61	15.57
C.V.%			1.2	5.3	14.7
LSD 10%			1	4	2.71

[1] *DAP = days after planting*

Planting Date: May 22
Harvest Date: October 6
Plant Population: 26,000 plants/A
Row Spacing: 30"
Previous Crop: barley
Soil Type: Williams Loam

2014 Safflower Variety Trial at Minot

Variety	Days to Bloom	Plant Height	Oil Content	Test Weight	Seed Yield 2012	Seed Yield 2014	Seed Yield Avg.
	DAP*	inches	%	lbs/bu	---------- lbs/A ----------		
Linoleic Types							
Morlin	76	26	37.6	35.4	2702	918	1810
Cardinal	77	30	36.2	36.7	2687	893	1790
NutraSaff	75	28	44.0	31.1	2187	703	1445
Finch	74	26	35.7	36.6	1777	686	1231
Oleic Types							
Hybrid 1601	76	29	37.0	31.8	3151	693	1922
Hybrid 9049	73	27	31.4	35.0	2699	793	1746
Montola 2003	77	25	36.3	37.2	1972	1143	1557
MonDak	74	27	34.9	35.6	2274	832	1553
Trial Mean	75	27	36.6	34.9	2431	833	--
C.V. %	1.0	2.5	2.7	1.7	6.7	8.4	--
LSD 10%	1	1	1.2	0.7	197	85	--

**Days after Planting*

Planting Date: May 23
Harvest Date: October 25
Seeding Rate: 300,000 live seeds / Acre (approx. 20 lbs/A).
Previous Crop: 2011 = summer fallow, 2013 = durum
Soil Type: Williams loam

2014 Oil Type Sunflower Variety Trial **North Central Research Extension Center—Minot**

Company/Brand	Hybrid	Herb Sys	Oil Type	Days to Bloom	Days Mature	Plant Height	Oil	Test Weight	Seed Yield 2012	Seed Yield 2013	Seed Yield 2014	Seed Yield 2 yr	Seed Yield 3 yr
				DAP*	DAP*	inches	%	lbs/bu	lbs/A	lbs/A	lbs/A	lbs/A	lbs/A
CROPLAN	559 CL	CL	NS	73	120	76	46.3	28.8	3040	2483	2641	2562	2721
CROPLAN	432 E	EX	NS	68	118	66	37.7	28.5	--	2091	1824	1958	--
CROPLAN	545 CL	CL	NS	74	119	69	41.3	28.3	--	--	2597	--	--
CROPLAN	14-572 CL	CL	HO	69	118	68	40.1	29.3	--	--	2445	--	--
CROPLAN	13-652 CL	CL	HO	75	115	70	44.1	24.6	--	--	2271	--	--
CROPLAN	13-08 E	EX	HO	71	120	67	42.5	29.3	--	--	2096	--	--
Genosys	11G08	Con	NS	74	114	72	42.3	30.0	2257	2904	2624	2764	2595
Genosys	12E14	CL	HO	71	121	75	37.6	26.7	2978	2541	1955	2248	2491
Genosys	12E12	CL	HO	71	120	71	36.6	28.2	2070	2599	2053	2326	2241
Genosys	12E13	CL	HO	70	117	64	39.0	27.4	2572	1902	2205	2054	2226
Genosys	12G20	CL	HO	71	117	67	41.4	30.8	--	2744	2189	2466	--
Genosys	12E06	Con	HO	70	119	70	39.0	29.7	--	2715	1819	2267	--
Genosys	12G25	CL	HO	71	120	67	44.7	30.5	--	--	1982	--	--
Mycogen Seeds	8N358CLDM	CL	NS	70	115	64	47.4	28.8	2998	2294	2390	2342	2561
Mycogen Seeds	8H449CLDM	CL	HO	73	122	62	47.6	29.9	3548	1975	1966	1970	2496
Mycogen Seeds	8H288CLDM	CL	HO	69	117	62	43.9	27.1	2504	2134	2526	2330	2388
Mycogen Seeds	8D310CL	CL	NS	71	116	71	37.1	26.5	--	2599	2369	2484	--
Nuseed	Camaro II	CL	NS	72	117	71	41.4	30.3	3063	2280	2456	2368	2600
Nuseed	Falcon	EX	NS	72	119	65	46.3	30.8	2460	1960	1840	1900	2087
Nuseed	Cobalt II	CL	HO	69	119	68	40.8	30.2	1930	1844	1928	1886	1901
Nuseed	NHK12M140	CL	HO	75	119	72	42.0	24.5	--	2033	2374	2204	--
Nuseed	Hornet	CL	HO	75	119	71	40.5	26.5	--	--	2586	--	--
Nuseed	NHK12M011	CL	HO	74	118	68	41.8	28.1	--	--	2526	--	--
Nuseed	Badger	CL	TR	72	117	69	39.5	27.2	--	--	2352	--	--
Nuseed	NHK12M054	CL	HO	69	114	65	41.0	32.2	--	--	2287	--	--
Nuseed	Badger DMR	CL	TR	67	116	66	36.8	29.0	--	--	2281	--	--
Nuseed	Talon	EX	NS	70	120	63	42.2	26.4	--	--	1977	--	--
Nuseed	Badger HO	CL	HO	67	118	73	37.1	26.1	--	--	1699	--	--
Proseed	E-362436	Con	HO	71	116	72	40.6	30.0	2647	2933	2287	2610	2622
Proseed	E-85 CL	CL	HO	71	122	71	37.2	27.2	2626	2004	1819	1911	2150
Proseed	E-21 CL	CL	HO	71	119	69	36.9	27.9	2086	2120	1846	1983	2017
Proseed	E-31 CL	CL	HO	72	118	68	38.8	26.5	--	2222	2156	2189	--

Company/Brand	Hybrid	Herb Sys	Oil Type	Days to Bloom	Days Mature	Plant Height	Oil	Test Weight	Seed Yield 2012	Seed Yield 2013	Seed Yield 2014	Seed Yield 2 yr	Seed Yield 3 yr
				DAP*	DAP*	inches	%	lbs/bu	lbs/A	lbs/A	lbs/A	lbs/A	lbs/A
Scherr AgVenture	AF3N692ES	EX	NS	75	119	69	41.3	29.1	--	--	2303	--	--
Scherr AgVenture	AF3H681ES	EX	HO	73	119	72	39.0	30.8	--	--	1889	--	--
Scherr ProSun	3N94DM	CL	NS	73	117	70	39.6	29.0	--	2468	2352	2410	--
Scherr ProSun	3H93DM	CL	HO	69	117	68	41.7	30.4	--	2381	1928	2154	--
Semillas Fito	SF7G04	--	TR	70	115	65	40.5	30.0	--	--	2385	--	--
Semillas Fito	SF10G38	--	HO	73	117	66	43.2	26.7	--	--	2265	--	--
Semillas Fito	SF11G39	--	TR	71	116	61	38.9	26.7	--	--	1846	--	--
SunOpta	4421CL	CL	NS	74	117	71	37.5	26.6	2370	2614	2483	2548	2489
SunOpta	EX25CL	CL	--	75	122	55	37.8	27.9	--	--	1873	--	--
SunOpta	EX213	--	--	66	115	60	36.8	25.7	--	--	1759	--	--
Syngenta	3495	CL	NS	73	117	67	40.8	32.3	--	--	2516	--	--
Syngenta	NX34240	CL	HO	73	118	71	40.8	27.5	--	--	2488	--	--
Syngenta	SY7717	CL	HO	70	120	65	39.1	28.8	--	--	2216	--	--
Syngenta	7111	CL	HO	68	120	61	41.5	29.1	--	--	1606	--	--
USDA	Hybrid 894	Con	TR	69	118	63	39.1	29.3	--	2396	1672	2034	--
Trial Mean				71	118	67	40.7	28.5	2582	2327	2166	--	--
C.V.%				1.3	1.3	5.5	1.9	2.9	10.7	9.5	11.0	--	--
LSD 10%				1	2	4	0.9	1.0	321	259	278	--	--

**DAP = Days after planting.*

Planting Date: May 30 *Plant Population: 24,000 plants/A* *Row Spracing: 30"*

Harvest Date: October 23 *Previous Crop: 2011 = summer fallow, 2012 = field pea, 2013 = spring wheat*

Soil Type: Williams loam

Note: Yield, test weight and oil content are adjusted to 10% moisture.

2014 Sunflower Variety Trial—Non-Oil **North Central Research Extension Center—Minot**

Company/Brand	Hybrid	Days to 50% Flower	Days to Maturity	Plant Height	Test Weight	Seed Over Screen			Seed Yield				
						>22/64	>20/64	>18/64	2012	2013	2014	2 Year	3 Year
		DAP[1]	DAP[1]	inches	lb/bu	----------%----------			----------lbs/A----------				
CanSun LLC	EX 5255	68	118	66	20.7	87	94	97	--	1958	2026	1992	--
CanSun LLC	EX 8255	70	119	63	21.9	79	91	96	--	1912	1965	1938	--
CanSun LLC	EX 755	72	119	64	22.1	77	90	96	--	--	2239	--	--
CHS Royal Hybrid	RH1130-EX	72	121	66	22.4	94	98	99	2231	1417	2165	1791	1938
CHS Royal Hybrid	RH841	69	117	68	22.1	97	99	99	--	--	2714	--	--
CHS Royal Hybrid	RH609CL	70	119	67	21.5	95	98	99	--	--	2309	--	--
Genosys	12GCF05	73	122	74	21.1	91	97	99	1880	1909	2165	2037	1985
Genosys	12GCF12	73	117	78	19.8	89	95	98	--	2572	1978	2275	--
Genosys	12GCF18	73	119	76	22.0	88	98	100	--	--	2792	--	--
Genosys	12GCF07	73	119	78	20.9	91	97	99	--	--	2309	--	--
Genosys	14GCF01	71	115	75	20.8	83	95	99	--	--	2047	--	--
Mycogen Seeds	8C451CP	72	118	66	21.2	92	98	99	2024	1962	2269	2116	2085
Nuseed Global	6946 DMR	71	117	62	21.8	62	89	97	2126	1784	2287	2035	2066
Nuseed Global	Sundance DMR	69	115	71	23.2	75	94	99	2048	1792	2291	2042	2044
Nuseed Global	X9180	68	119	60	21.7	88	97	99	1992	1519	2374	1947	1962
Nuseed Global	Jaguar	69	117	60	20.0	93	97	99	1947	1724	2187	1955	1953
Nuseed Global	Jaguar DMR	66	117	62	21.2	91	97	99	1846	1940	2012	1976	1933
Nuseed Global	NHW12709	70	116	73	20.0	94	98	99	--	2248	2535	2392	--
Nuseed Global	NHW12706	72	123	72	24.2	71	89	97	--	2012	2161	2086	--
Nuseed Global	Panther DMR	66	115	58	21.8	86	96	99	--	1909	2073	1991	--
Nuseed Global	NSK12M045	69	117	70	19.6	95	99	99	--	--	2309	--	--
Nuseed Global	NHW12732	68	116	68	21.5	91	98	99	--	--	2283	--	--
Nuseed Global	NSK12M044	65	115	63	19.4	95	98	100	--	--	2091	--	--
Nuseed Global	NHW12759	69	120	66	18.2	92	95	98	--	--	1825	--	--
Red River Comm.	2215 cl	71	118	67	23.0	89	98	99	2409	1562	2422	1992	2131
Red River Comm.	2215	69	116	68	22.1	90	98	100	2289	1702	2226	1964	2072
Red River Comm.	2217CP	72	120	64	21.3	92	98	99	1243	1731	2178	1955	1717

Company/Brand	Hybrid	Days to 50% Flower	Days to Maturity	Plant Height	Test Weight	Seed Over Screen			Seed Yield				
						>22/64	>20/64	>18/64	2012	2013	2014	2 Year	3 Year
		DAP[1]	DAP[1]	inches	lb/bu	----------%----------			----------lbs/A----------				
SunOpta	9521	69	120	68	22.7	92	97	99	--	2217	2644	2431	--
SunOpta	EX041	70	118	70	22.0	97	99	99	--	--	2775	--	--
SunOpta	EX019	69	118	73	21.2	97	98	99	--	--	2557	--	--
SunOpta	EX011	70	120	66	21.5	96	99	99	--	--	2479	--	--
USDA check	Hybrid 924	67	114	65	22.2	67	93	99	--	--	1429	--	--
Trial Mean		70	118	68	21.4	88	96	99	2027	1769	2254	--	--
C.V.%		1.0	1.1	4.7	2.0	5.3	2.2	0.7	13.2	17.8	9.4	--	--
LSD 10%		1	1	4	0.5	5	2	1	316	369	152	--	--

[1] *Days After Planting*

Planting Date: May 30
Plant Population: 18,000 plants/A
Row Spacing: 30"
Harvest Date: October 24
Previous Crop: 2011 = Summer fallow, 2012 = field pea, 2013 = spring wheat
Soil Type: Williams Loam

2014 Roundup Ready Soybean Variety Trial—Minot

Company/Brand	Variety	Maturity Group	IDC Rating	Days to Mature	Plant Height	Protein	Oil	Test Weight	Yield
			1-5[a]	DAP[b]	inches	%	%	lbs/bu	bu/A
AgVenture Scherr	006Z6RR	00.6	--	115	28	26.4	17.0	56.8	38.0
AgVenture Scherr	009E3RR	00.9	--	119	25	27.2	16.6	57.0	39.2
AgVenture Scherr	EX200RR	0.0	--	116	31	27.5	16.4	56.9	41.7
AgVenture Scherr	EX202RR	0.2	--	119	27	26.4	17.0	56.3	42.3
AgVenture Scherr	04E4	0.4	2.1	126	29	29.9	15.9	57.2	41.1
Dyna-Gro Seed	S008RY43	00.8	1.4	115	27	27.1	16.6	56.2	46.3
Dyna-Gro Seed	S02RY74	0.2	2.0	117	28	28.0	15.6	57.6	39.4
Dyna-Gro Seed	34RY03	0.3	1.3	116	32	28.6	15.6	57.8	38.4
Integra	20031	00.5	1.7	121	31	30.2	15.1	57.2	41.9
Integra	20090	00.9	1.7	117	29	28.5	16.0	57.1	36.2
Integra	20215	0.1	2.2	121	26	30.3	15.5	56.6	55.1
Integra	20109	0.1	2.5	125	28	29.3	15.4	57.9	42.5
Integra	20126	0.1	1.8	119	29	29.0	16.5	56.6	41.3
Integra	201B1	00.9	1.7	115	32	27.9	16.3	56.7	40.7
Legacy Seeds	LS00734	00.7	1.8	113	30	27.9	16.5	56.7	34.1
Legacy Seeds	LS00834	00.8	1.7	113	24	28.6	15.9	56.7	37.3
Legacy Seeds	LS0214	0.2	1.8	121	26	28.3	16.5	56.3	43.5
Legacy Seeds	LS0334	0.3	1.7	124	29	28.2	16.3	56.5	39.9
Legacy Seeds	LS0134	0.1	2.3	124	25	28.9	15.5	57.0	39.1
Legend Seeds	LS 003R21	00.3	1.5	115	27	31.4	16.5	56.6	46.2
Legend Seeds	LS 008R560N	00.8	1.5	124	26	26.9	16.2	56.4	38.2
Legend Seeds	LS 009R20	00.9	1.7	115	28	27.6	16.5	57.3	40.7
Legend Seeds	LS 005R24	00.5	1.9	115	30	29.9	15.2	57.1	46.0
Legend Seeds	LS 003R24N	00.3	1.9	114	30	28.1	16.6	56.2	35.8
Mycogen Seeds	5B005R2	00.5	1.8	113	26	27.6	17.0	56.8	38.8
Mycogen Seeds	5G009R2	00.9	1.7	115	32	28.1	16.0	57.7	40.0
Mycogen Seeds	X54G007R2	00.7	1.7	114	24	29.4	15.8	56.4	39.1
Mycogen Seeds	X54J009R2	00.9	2.0	122	25	27.4	15.9	56.5	39.6
Northstar Genetics	NS 0080R2	00.6	1.5	116	30	28.8	15.7	56.8	37.7
Northstar Genetics	NS 0096R2	00.9	1.6	115	30	27.7	16.4	56.5	39.8
Northstar Genetics	NS 0318R2	0.3	2.0	124	29	29.8	15.6	56.0	52.1
Nuseed	2034 RR2YN	0.3	1.6	121	33	28.8	16.0	57.9	44.7
Nuseed	0074 RR2YN	00.7	1.9	113	29	26.2	16.6	57.2	32.7
Peterson Farms Seed	15R006N	00.6	1.8	114	28	27.6	16.3	56.4	30.0
Peterson Farms Seed	14R008	00.8	1.6	115	25	28.5	15.8	56.6	37.6
Peterson Farms Seed	14R02	0.2	1.9	128	25	29.8	15.8	57.1	39.4
Prairie Brand	PB-00766R2	00.7	1.7	113	26	29.7	16.0	56.5	36.1
Prairie Brand	PB-00844R2	00.8	1.5	115	26	28.6	16.4	55.6	41.7
Prairie Brand	PB-00950R2	00.9	1.5	116	28	27.2	16.0	57.5	36.4
Prairie Brand	PB-0240R2	0.1	1.4	116	28	28.9	16.3	57.2	39.9
Prairie Brand	PB-0291R2	0.1	2.0	123	28	28.0	15.9	57.2	41.9
Proseed	P2 10-08	00.8	1.6	117	31	30.1	15.8	58.3	44.7
Proseed	P2 20-08	00.8	1.6	115	29	29.9	16.2	55.9	49.1
Proseed	30-07	00.7	1.8	116	26	29.0	15.6	56.8	35.1
Proseed	P2 11-07	00.7	1.7	115	29	29.1	16.8	56.6	41.1
Proseed	30-20	0.2	1.9	119	31	27.0	16.8	56.7	49.3
Proseed	P2 20-30	0.3	1.8	125	27	27.0	15.8	57.3	44.1

2014 Roundup Ready Soybean Variety Trial—Minot—Continued

Company/Brand	Variety	Maturity Group	IDC Rating	Days to Mature	Plant Height	Protein	Oil	Test Weight	Yield
			1-5[a]	DAP[b]	inches	%	%	lbs/bu	bu/A
REA Hybrids	53G32	00.6	2.0	114	26	29.2	16.5	56.8	38.4
REA Hybrids	55G14	00.7	1.8	115	32	26.2	16.1	56.8	36.0
REA Hybrids	58G82	00.8	1.5	118	28	29.3	15.6	57.4	44.0
REA Hybrids	61G24	00.9	2.4	127	28	34.0	14.5	57.6	58.7
REA Hybrids	62G22	00.9	1.5	116	33	29.3	15.8	57.2	35.3
Thunder Seed	32005 R2Y	0.3	1.6	114	26	29.2	16.5	56.8	46.2
Thunder Seed	34006 R2Y	00.6	1.9	113	28	27.0	16.5	57.0	34.5
Thunder Seed	35007 R2YN	00.8	1.9	113	31	29.1	15.8	57.0	43.6
Thunder Seed	Astro	00.9	1.6	119	33	29.6	15.5	56.9	43.8
Thunder Seed	31009 R2Y	0.2	1.5	118	36	28.5	15.6	57.2	48.1
Thunder Seed	33009 R2YN	00.9	2.1	118	23	28.4	16.2	56.0	42.5
Thunder Seed	3503 R2Y	0.3	1.5	120	31	31.3	15.3	57.5	53.3
Wensman Seed	W 30061NR2	0.06	1.7	113	30	27.1	16.6	57.0	34.9
Wensman Seed	W 30084R2	0.08	1.6	118	29	27.6	15.9	57.2	34.8
Wensman Seed	W 30099R2	0.09	1.7	117	34	27.2	16.5	57.1	39.1
Wensman Seed	W 3024R2	0.2	2.2	118	28	29.8	15.5	56.9	47.1
Trial Mean				117	29	28.6	16.1	56.9	41.2
C.V.%				1.3	5.6	4.4	1.9	0.8	7.9
LSD 10%				2	2	1.5	0.4	0.6	3.8

[a] *IDC rating = Iron deficiency chlorosis rating: 1 - green, 3 - yellow, 5 - dead*

[b] *DAP = days after planting.*

Planting Date: May 23
Planting Rate: 200,000 PLS/A
Row Spacing: Solid Seeded (6" rows)
Harvest Date: October 21
Previous Crop: Barley
Soil Type: Williams Loam
Note: Oil, protein, test weight and yield are adjusted to 13% moisture.

2014 Soybean Variety Trial at Mohall

Cooperators: Dean Schoenberg and the Renville/Bottineau Ag Improvement Association

Company/Brand	Variety	Maturity Group	IDC Rating	Plant Height	Protein	Oil	Test Weight	Yield
			1-5[a]	inches	%	%	lbs/bu	bu/A
AgVenture Scherr	006Z6RR	00.6	--	22	33.4	15.3	58.2	31.2
AgVenture Scherr	009E3RR	00.9	--	22	33.7	14.7	57.7	35.2
Asgrow	AG0231	0.2	2.2	28	34.8	13.6	59.0	32.2
Integra	20031	00.5	1.7	31	33.7	13.8	58.4	35.6
Integra	20076N	00.7	1.9	26	33.8	13.8	58.0	34.5
Integra	20090	00.9	1.7	30	32.9	14.7	58.1	43.4
Integra	20215	0.1	2.2	30	34.5	13.6	58.6	45.8
Integra	201B1	00.9	1.7	26	33.4	14.6	58.5	38.2
Legacy Seeds	LS00734	00.7	1.8	26	33.8	13.4	58.1	31.5
Legacy Seeds	LS00834	00.8	1.7	22	34.4	13.3	58.9	34.9
Legacy Seeds	LS0214	0.2	1.8	28	34.7	14.4	58.2	40.6
Legacy Seeds	LS0334	0.3	1.7	27	32.9	14.3	58.8	25.3
Legacy Seeds	LS0134	0.1	2.3	25	34.1	13.5	59.1	33.4
Northstar Genetics	NS 0080R2	00.6	1.5	25	33.6	14.1	58.3	33.3
Northstar Genetics	NS 0096R2	00.9	1.6	26	33.5	14.5	58.1	35.9
Nuseed	2034 RR2YN	0.3	1.6	32	34.8	13.6	59.3	35.2
Nuseed	0074 RR2YN	00.7	1.9	27	34.3	13.4	58.3	28.7
Peterson Farms Seed	15R006N	00.6	1.8	25	33.7	13.5	58.3	32.9
Peterson Farms Seed	14R008	00.8	1.6	21	34.1	13.5	58.3	38.9
Prairie Brand	PB-00766R2	00.7	1.7	25	33.4	14.0	58.6	31.9
Prairie Brand	PB-00844R2	00.8	1.5	25	33.3	14.9	57.8	34.2
Prairie Brand	PB-00950R2	00.9	1.5	28	34.6	13.7	59.6	42.5
Prairie Brand	PB-0240R2	0.1	1.4	32	34.4	13.4	59.4	30.4
Prairie Brand	PB-0291R2	0.1	2.0	25	34.5	13.6	58.6	27.8
Proseed	P2 10-08	00.8	1.6	28	33.5	14.0	58.9	45.3
Proseed	P2 20-08	00.8	1.6	30	33.4	14.4	58.0	43.2
Proseed	30-07	00.7	1.8	27	34.5	13.2	58.3	37.0
Proseed	P2 11-07	00.7	1.7	28	34.5	14.8	58.0	39.0
Proseed	30-20	0.2	1.9	27	34.2	14.5	58.1	42.9
Proseed	P2 20-30	0.3	1.8	25	33.2	14.2	58.7	35.4
REA Hybrids	55G14	00.5	1.8	26	34.5	13.5	58.4	31.4
REA Hybrids	53G32	00.3	2.0	20	33.5	14.8	57.6	31.3
Thunder Seed	32005 R2Y	00.5	1.6	22	34.1	14.4	58.3	30.7
Thunder Seed	34006 R2Y	00.6	1.9	27	34.1	14.4	58.1	45.5
Thunder Seed	35007 R2YN	00.7	1.9	26	33.3	13.7	58.0	32.3
Thunder Seed	Astro	00.8	1.6	29	33.5	14.0	58.7	43.1
Thunder Seed	31009 R2Y	00.9	1.5	29	33.4	14.1	58.9	42.2
Thunder Seed	33009 R2YN	00.9	2.1	26	32.9	14.9	58.0	34.8
Thunder Seed	3503 R2Y	0.3	1.5	27	34.5	14.1	58.8	46.3
Wensman Seed	W 30061NR2	00.6	1.7	25	33.8	13.5	58.1	30.9
Wensman Seed	W 30084R2	00.8	1.6	26	33.7	14.0	58.8	45.3
Wensman Seed	W 30099R2	00.9	1.7	30	33.6	14.4	59.1	42.6
Wensman Seed	W 3024R2	0.2	2.2	27	34.2	13.4	59.0	41.2
Trial Mean				26	33.9	14.0	58.5	36.6
C.V.%				6.9	2.5	2.6	0.7	11.7
LSD 10%				0.5	1.0	0.4	0.5	5.0

[a] *IDC rating = Iron deficiency chlorosis rating: 1 - green, 3 - yellow, 5 - dead*

Planting Date: May 28
Harvest Date: October 20
Previous Crop: canola
Planting Rate: 200,000 PLS/A
Row Spacing: Solid Seeded (6" rows)
Soil Type: Barnes loam

Note: Protein, oil, test weight and yield are adjusted to 13% moisture.

2014 Soybean Variety Trial at Garrison Cooperator: Mike Zimmerman, Garrison

Company/Brand	Variety	Maturity Group	IDC Rating	Plant Height	Protein	Oil	Test Weight	Yield
			1-5[a]	inches	%	%	lbs/bu	bu/A
AgVenture Scherr	006Z6RR	00.6	--	13	31.3	16.4	57.4	33.8
AgVenture Scherr	009E3RR	00.9	--	13	31.2	16.4	57.6	33.3
AgVenture Scherr	EX202RR	0.0	--	14	31.2	16.3	57.6	30.8
AgVenture Scherr	04E4	0.4	2.1	19	32.5	15.9	57.4	33.3
Asgrow	AG0231	0.2	2.2	18	32.3	15.3	58.2	25.5
Integra	20090	00.9	1.7	16	31.7	15.9	57.8	39.9
Integra	20215	0.1	2.2	18	31.4	15.1	58.2	42.5
Integra	20109	0.1	2.5	17	33.0	15.7	57.6	22.6
Integra	20126	0.1	1.8	20	32.9	15.7	57.1	38.3
Legacy Seeds	LS00734	00.7	1.8	17	32.0	15.4	57.3	35.5
Legacy Seeds	LS00834	00.8	1.7	16	32.2	15.2	57.8	43.0
Legacy Seeds	LS0214	0.2	1.8	18	33.0	15.7	57.1	42.4
Legacy Seeds	LS0334	0.3	1.7	20	32.8	15.6	57.3	32.2
Legacy Seeds	LS0134	0.1	2.3	16	32.7	15.8	57.5	27.8
Northstar Genetics	NS 0096R2	00.9	1.6	18	32.1	15.7	57.9	46.6
Northstar Genetics	NS 0318R2	0.3	1.9	20	33.0	15.1	57.7	36.9
Nuseed	2034 RR2YN	0.3	1.6	21	33.6	15.1	58.2	34.8
Nuseed	0074 RR2YN	00.7	1.9	16	32.0	15.8	57.1	29.7
Peterson Farms Seed	14R02	0.2	1.9	15	32.2	15.2	57.9	29.0
Peterson Farms Seed	13R03	0.3	1.7	17	32.5	15.3	57.6	31.3
Peterson Farms Seed	15R04	0.4	2.0	17	33.3	15.6	55.9	28.0
Proseed	P2 10-08	00.8	1.6	17	31.9	15.9	57.9	45.2
Proseed	P2 20-08	00.8	1.6	13	31.2	16.1	57.4	37.6
Proseed	30-07	00.7	1.8	13	32.7	15.1	57.7	24.7
Proseed	P2 11-07	00.7	1.7	14	33.6	16.1	57.5	40.3
Proseed	30-20	0.2	1.9	19	32.7	15.9	57.5	45.0
Proseed	P2 20-30	0.3	1.8	21	32.6	15.4	57.4	44.7
REA Hybrids	58G82	00.8	1.5	15	32.1	15.3	57.4	31.2
REA Hybrids	61G24	0.1	2.4	18	33.5	15.3	57.4	30.3
REA Hybrids	62G22	0.2	1.5	20	34.4	14.9	57.9	40.9
Thunder Seed	32005 R2Y	00.5	1.6	14	32.5	16.4	57.3	31.6
Thunder Seed	34006 R2Y	00.6	1.9	15	32.7	15.5	57.5	34.3
Thunder Seed	35007 R2YN	00.7	1.9	16	32.4	15.2	57.7	30.5
Thunder Seed	Astro	00.8	1.6	18	32.6	15.0	57.8	41.3
Thunder Seed	31009 R2Y	00.9	1.5	18	32.1	15.4	58.0	46.1
Thunder Seed	33009 R2YN	00.9	2.1	12	31.7	15.8	57.4	23.5
Thunder Seed	3503 R2Y	0.3	1.5	17	32.1	15.5	57.7	45.7
Wensman Seed	W 30061NR2	00.6	1.7	14	32.0	15.5	57.1	32.6
Wensman Seed	W 30099R2	00.9	1.7	19	33.0	15.5	57.9	49.4
Wensman Seed	W 3024R2	0.2	2.2	18	32.0	14.9	58.1	41.7
Wensman Seed	W 3032R2	0.4	2.1	18	32.5	15.6	57.5	41.5
Trial Mean				17	32.4	15.6	57.6	36.0
C.V.%				14.2	1.5	1.7	0.4	11.5
LSD 10%				3	0.6	0.3	0.3	4.8

[a] *IDC rating = Iron deficiency chlorosis rating: 1 - green, 3 - yellow, 5 - dead*

Planting Date: May 29 *Planting Rate: 200,000 PLS/A*
Harvest Date: October 16 *Row Spacing: Solid Seeded (6" rows)*
Previous Crop: sunflower *Soil Type: Williams Bowbells Loam*
Note: Protein, oil, test weight and yield are adjusted to 13% moisture.

2014 RR Soybean Yield Results from the North Central Region

Company / Brand	Variety	Maturity Group	IDC Rating	Seed Yield			3 Location Average
				Minot	Mohall	Garrison	
			1-5[a]	bushels per acre			
AgVenture Scherr	009E3RR	00.9	--	39.2	35.2	33.3	35.9
AgVenture Scherr	006Z6RR	00.6	--	38.0	31.2	33.8	34.3
AgVenture Scherr	04E4	0.4	2.1	41.1	--	33.3	--
AgVenture Scherr	EX202RR	0.2	--	42.3	--	30.8	--
AgVenture Scherr	EX200RR	0.0	--	41.7	--	--	--
Asgrow	AG0231	0.2	2.2	--	32.2	25.5	--
Dyna-Gro Seed	S008RY43	00.8	1.4	46.3	--	--	--
Dyna-Gro Seed	S02RY74	0.2	2.0	39.4	--	--	--
Dyna-Gro Seed	34RY03	0.3	1.3	38.4	--	--	--
Integra	20215	0.1	2.2	55.1	45.8	42.5	47.8
Integra	20090	00.9	1.7	36.2	43.4	39.9	39.8
Integra	20126	0.1	1.8	41.3	--	38.3	--
Integra	20109	0.1	2.5	42.5	--	22.6	--
Integra	201B1	00.9	1.7	40.7	38.2	--	--
Integra	20031	00.5	1.7	41.9	35.6	--	--
Integra	20076N	00.7	1.9	--	34.5	--	--
Legacy Seeds	LS0214	0.2	1.8	43.5	40.6	42.4	42.2
Legacy Seeds	LS00834	00.8	1.7	37.3	34.9	43.0	38.4
Legacy Seeds	LS00734	00.7	1.8	34.1	31.5	35.5	33.7
Legacy Seeds	LS0134	0.1	2.3	39.1	33.4	27.8	33.4
Legacy Seeds	LS0334	0.3	1.7	39.9	25.3	32.2	32.5
Legend Seeds	LS 003R21	00.3	1.5	46.2	--	--	--
Legend Seeds	LS 005R24	00.5	1.9	46.0	--	--	--
Legend Seeds	LS 009R20	00.9	1.7	40.7	--	--	--
Legend Seeds	LS 008R560N	00.8	1.5	38.2	--	--	--
Legend Seeds	LS 003R24N	00.3	1.9	35.8	--	--	--
Mycogen Seeds	5G009R2	00.9	1.7	40.0	--	--	--
Mycogen Seeds	X54J009R2	00.9	2.0	39.6	--	--	--
Mycogen Seeds	X54G007R2	00.7	1.7	39.1	--	--	--
Mycogen Seeds	5B005R2	00.5	1.8	38.8	--	--	--
Northstar Genetics	NS 0096R2	00.9	1.6	39.8	35.9	46.6	40.8
Northstar Genetics	NS 0318R2	0.3	2.0	52.1	--	36.9	--
Northstar Genetics	NS 0080R2	00.6	1.5	37.7	33.3	--	--
Nuseed	2034 RR2YN	0.3	1.6	44.7	35.2	34.8	38.2
Nuseed	0074 RR2YN	00.7	1.9	32.7	28.7	29.7	30.4
Peterson Farms Seed	14R02	0.2	1.9	39.4	--	29.0	--
Peterson Farms Seed	14R008	00.8	1.6	37.6	38.9	--	--
Peterson Farms Seed	15R006N	00.6	1.8	30.0	32.9	--	--
Peterson Farms Seed	13R03	0.3	1.7	--	--	31.3	--
Peterson Farms Seed	15R04	0.4	2.0	--	--	28.0	--
Prairie Brand	PB-00950R2	00.9	1.5	36.4	42.5	--	--
Prairie Brand	PB-00844R2	00.8	1.5	41.7	34.2	--	--
Prairie Brand	PB-00766R2	00.7	1.7	36.1	31.9	--	--
Prairie Brand	PB-0240R2	0.1	1.4	39.9	30.4	--	--
Prairie Brand	PB-0291R2	0.1	2.0	41.9	27.8	--	--

2014 RR Soybean Yield Results from the North Central Region Continued

Company / Brand	Variety	Maturity Group	IDC Rating	Seed Yield			3 Location Average
				Minot	Mohall	Garrison	
			1-5[a]	bushels per acre			
Proseed	30-20	0.2	1.9	49.3	42.9	45.0	45.7
Proseed	P2 10-08	00.8	1.6	44.7	45.3	45.2	45.0
Proseed	P2 20-08	00.8	1.6	49.1	43.2	37.6	43.3
Proseed	P2 20-30	0.3	1.8	44.1	35.4	44.7	41.4
Proseed	P2 11-07	00.7	1.7	41.1	39.0	40.3	40.1
Proseed	30-07	00.7	1.8	35.1	37.0	24.7	32.3
REA Hybrids	62G22	0.2	1.5	35.3	--	40.9	--
REA Hybrids	55G14	00.5	1.8	36.0	31.4	--	--
REA Hybrids	53G32	00.3	2.0	38.4	31.3	--	--
REA Hybrids	61G24	0.1	2.4	58.7	--	30.3	--
REA Hybrids	58G82	00.8	1.5	44.0	--	31.2	--
Thunder Seed	3503 R2Y	0.3	1.5	53.3	46.3	45.7	48.4
Thunder Seed	31009 R2Y	00.9	1.5	48.1	42.2	46.1	45.5
Thunder Seed	Astro	00.8	1.6	43.8	43.1	41.3	42.7
Thunder Seed	34006 R2Y	00.6	1.9	34.5	45.5	34.3	38.1
Thunder Seed	32005 R2Y	00.5	1.6	46.2	30.7	31.6	36.2
Thunder Seed	35007 R2YN	00.7	1.9	43.6	32.3	30.5	35.5
Thunder Seed	33009 R2YN	00.9	2.1	42.5	34.8	23.5	33.6
Wensman Seed	W 30099R2	00.9	1.7	39.1	42.6	49.4	43.7
Wensman Seed	W 3024R2	0.2	2.2	47.1	41.2	41.7	43.3
Wensman Seed	W 30061NR2	00.6	1.7	34.9	30.9	32.6	32.8
Wensman Seed	W 30084R2	00.8	1.6	34.8	45.3	--	--
Wensman Seed	W 3032R2	0.4	2.1	--	--	41.5	--

2014 Non-Roundup Ready Soybean Variety Trial—Minot

Company/Brand	Variety	Maturity Group	Herbicide System	IDC Rating	Days to Mature	Plant Height	Protein	Oil	Test Weight	----- Seed Yield ----- 2013	2014	Avg
				1-5[a]	DAP[b]	inches	%	%	lbs/bu	bushels per acre		
Thunder Seed	5401LL	0.1	LL	1.7	117	29	26.6	17.0	55.0	--	32.3	--
Thunder Seed	5205LL	0.5	LL	2.0	124	36	27.9	16.4	57.1	--	47.5	--
Thunder Seed	5303 LL	0.3	LL	2.0	121	27	28.9	17.1	56.4	--	48.6	--
Northstar Genetics	0095LL	00.9	LL	1.5	115	28	26.9	16.9	56.5	51.1	39.3	45.2
Northstar Genetics	0129LL	0.1	LL	1.9	120	29	25.8	17.5	56.1	--	43.3	--
Integra	30080	0.08	LL	1.6	117	27	26.9	17.0	56.3	51.1	32.7	41.9
Integra	30300	0.3	LL	1.9	119	27	26.8	17.6	55.6	47.3	41.9	44.6
NDSU	Cavalier	00.9	Conv	2.3	114	28	27.7	16.9	56.0	40.6	32.3	36.4
NDSU	Traill	0.0	Conv	1.6	119	28	29.5	16.3	58.3	43.6	45.1	44.4
NDSU	Sheyenne	0.7	Conv	1.8	124	31	25.7	16.8	57.6	41.3	39.5	40.4
NDSU	Ashtabula	0.4	Conv	2.2	122	29	25.2	17.1	56.6	39.3	51.7	45.5
check	RG607	0.7	RR	2.0	123	29	27.6	17.2	57.5	--	45.7	--
Check	AG 00932	00.9	RR	1.3	123	30	26.5	16.7	57.2	--	38.0	--
Trial Mean					120	29	27.2	17.0	56.7	45.8	41.7	--
C.V.%					0.8	6	1.0	1.5	1.4	4.7	8.8	--
LSD 10%					1	2	0.3	0.3	0.9	2.6	4.4	--

[a] *IDC rating = Iron deficiency chlorosis rating: 1 - green, 3 - yellow, 5 - dead*

[b] *DAP = days after planting.*

Planting Date: May 23
Planting Rate: 200,000 PLS/A
Row Spacing: Solid Seeded (6" rows)
Harvest Date: October 21
Previous Crop: 2012 & 2013 = durum
Soil Type: Williams Loam
Note: Oil, protein, test weight and yield are adjusted to 13% moisture.

2013 Soybean Planting Date x Row Spacing x Seeding Rate Trial at Minot

This trial was designed to investigate agronomic, seed yield and seed quality issues as they relate to various soybean production practices. The trial was conducted at the North Central Research Extension Center in Minot. The table below is a compelation of all data relating to these practices. Subsequent tables show data for specific production practices and interactions between production practices.

Planting Date	Row Spacing	Seeding Rate	Days to Mature	Lodging	Seed Protein	Oil Content	Test Weight	Seed Yield
	inches	1000's	DAP[a]	0-9[b]	%	%	lbs/bu	bu/A
May 29	7	100	111	1.5	36.6	14.6	57.0	47.7
May 29	7	150	111	2.0	36.4	14.8	57.1	56.0
May 29	7	200	111	1.5	36.9	14.6	57.1	58.6
May 29	7	250	111	2.2	36.5	14.8	57.0	67.2
May 29	21	100	111	1.5	36.4	14.6	56.6	56.2
May 29	21	150	111	1.2	36.6	14.6	57.1	58.9
May 29	21	200	111	1.5	36.6	14.7	57.1	62.6
May 29	21	250	111	1.0	36.8	14.6	57.2	65.3
May 29	30	100	111	1.0	36.4	14.4	56.8	40.6
May 29	30	150	111	1.0	36.3	14.9	56.9	48.2
May 29	30	200	111	1.5	36.2	14.5	56.9	58.3
May 29	30	250	111	1.0	36.4	14.5	57.0	48.6
June 11	7	100	98	2.5	35.6	14.7	57.0	57.0
June 11	7	150	98	2.2	35.7	15.1	57.0	54.3
June 11	7	200	98	3.0	35.4	15.1	57.0	66.9
June 11	7	250	98	2.5	35.8	14.9	57.0	74.2
June 11	21	100	98	1.2	35.9	15.0	57.1	53.3
June 11	21	150	98	1.2	35.7	15.1	57.1	57.1
June 11	21	200	98	1.5	36.0	14.9	57.0	68.0
June 11	21	250	98	1.8	36.0	15.0	57.1	64.3
June 11	30	100	98	1.0	35.8	15.2	57.3	46.2
June 11	30	150	98	1.0	36.1	14.9	57.1	58.7
June 11	30	200	98	1.2	36.3	15.1	57.2	60.3
June 11	30	250	98	1.5	36.7	14.9	57.2	62.1
June 25	7	100	97	2.2	35.9	14.2	56.2	49.6
June 25	7	150	97	2.0	35.8	14.3	56.1	48.6
June 25	7	200	97	1.8	36.4	14.0	55.9	60.5
June 25	7	250	97	2.5	36.5	14.2	55.9	50.8
June 25	21	100	97	2.0	35.9	13.9	55.1	45.3
June 25	21	150	97	1.2	36.1	14.0	55.3	48.2
June 25	21	200	97	1.5	36.6	13.8	54.9	52.2
June 25	21	250	97	1.5	36.2	14.0	56.1	63.3
June 25	30	100	97	1.2	36.3	14.1	55.7	41.4
June 25	30	150	97	1.2	37.0	13.8	55.5	47.7
June 25	30	200	97	1.2	36.7	14.0	55.7	42.1
June 25	30	250	97	1.5	37.2	13.7	55.6	51.7
Trial Mean				1.6	36.3	14.5	56.6	55.3
C.V.%				44.0	1.9	2.5	0.8	4.6
LSD 10%				0.8	0.8	0.4	0.5	3.0

[a] *DAP = days after planting.* [b] *Lodging: 0 = none, 9 = lying flat on the ground.*

Variety: Asgrow AG0231 (maturity = 0.2) *Harvest Date: October 26*
Previous Crop: durum *Soil Type: Williams Loam*

Combined Means—Planting Date

Lodging tended to increase slightly with later planting dates. There was no obvious trend for protein content. Oil content, test weight and yield were similar for the first two planting dates and decreased with the later planting date.

Planting Date	Days to Mature	Lodging	Seed Protein	Oil Content	Test Weight	Seed Yield
	DAP[a]	0-9[b]	%	%	lbs/bu	bu/A
May 29	111	1.4	36.5	14.6	57.0	55.7
June 11	98	1.7	35.9	15.0	57.1	60.2
June 25	97	1.7	36.4	14.0	55.7	50.1
LSD 10%	1.0	0.3	0.2	0.1	0.2	2.5

[a] *DAP = days after planting.*

[b] *Lodging: 0 = none, 9 = lying flat on the ground.*

Combined Means—Row Spacing

Lodging tended to decrease as row spacing increased. Row spacing had very little influence on protein content, oil content or test weight. Solid seeded and 21" rows had significantly higer yields than the 30" row spacing.

Row Spacing	Lodging	Seed Protein	Oil Content	Test Weight	Seed Yield
inches	0-9[b]	%	%	lbs/bu	bu/A
7	2.2	36.1	14.6	56.7	57.6
21	1.4	36.2	14.5	56.5	57.9
30	1.2	36.5	14.5	56.6	50.5
LSD 10%	0.2	0.2	NS	NS	2.7

[b] *Lodging: 0 = none, 9 = lying flat on the ground.*

NS= no statistical difference.

Combined Means—Seeding Rates

Seeding rate had very little influence on lodging, protein content, oil content or test weight. However, increased seeding rate resulted in significantly increased yield.

Seeding Rate	Lodging	Seed Protein	Oil Content	Test Weight	Seed Yield
1000's	0-9[b]	%	%	lbs/bu	bu/A
100	1.6	36.1	14.5	56.5	48.6
150	1.5	36.2	14.6	56.6	53.1
200	1.6	36.4	14.5	56.5	58.8
250	1.7	36.5	14.5	56.7	60.8
LSD 10%	NS	0.3	NS	NS	2.8

[b] *Lodging: 0 = none, 9 = lying flat on the ground.*

NS= no statistical difference.

Row Spacing x Seeding Rate Interactions

Interactions between row spacing and seeding rates were not observed for lodging, protein, oil or test weight. Yield tended to be higher with solid seeded or narrow rows in combination with higher seeding rates.

Row Spacing	Seeding Rate	Lodging	Seed Protein	Oil Content	Test Weight	Seed Yield
inches	1000's	0-9[b]	%	%	lbs/bu	bu/A
7	100	2.1	36.0	14.5	56.8	51.4
21	100	1.6	36.1	14.5	56.3	51.6
30	100	1.1	36.2	14.6	56.6	42.7
7	150	2.1	36.0	14.7	56.7	53.0
21	150	1.2	36.1	14.6	56.5	54.7
30	150	1.1	36.5	14.6	56.5	51.5
7	200	2.1	36.2	14.6	56.7	62.0
21	200	1.5	36.4	14.5	56.3	60.9
30	200	1.3	36.4	14.6	56.6	53.6
7	250	2.5	36.2	14.6	56.7	64.0
21	250	1.4	36.4	14.5	56.8	64.3
30	250	1.3	36.8	14.3	56.6	54.2
LSD 10%		NS	NS	NS	NS	1.2

[b] *Lodging: 0 = none, 9 = lying flat on the ground.*

NS= no statistical difference.

Planting Date x Seeding Rate Interactions

Interactions between planting date and seeding rates were not observed for lodging, protein, oil or test weight. Yield was higher with all seeding rates when planted on May 29 than on June 25 and significanly higher for all seeding rates when planted on June 11 than when planted on the other dates.

Planting Date	Seeding Rate	Lodging	Seed Protein	Oil Content	Test Weight	Seed Yield
	1000's	0-9[b]	%	%	lbs/bu	bu/A
May 29	100	1.3	36.5	14.5	56.8	48.2
June 11	100	1.6	35.8	15.0	57.2	52.2
June 25	100	1.8	36.0	14.1	55.7	45.4
May 29	150	1.4	36.4	14.8	57.0	54.4
June 11	150	1.5	35.8	15.0	57.1	56.7
June 25	150	1.5	36.3	14.0	55.6	48.2
May 29	200	1.5	36.6	14.6	57.0	59.8
June 11	200	1.9	35.9	15.0	57.1	65.0
June 25	200	1.5	36.6	14.0	55.4	51.6
May 29	250	1.4	36.6	14.6	57.1	60.4
June 11	250	1.9	36.2	14.9	57.1	66.9
June 25	250	1.8	36.6	13.9	55.9	55.2
LSD 10%		NS	NS	NS	NS	1.2

[b] *Lodging: 0 = none, 9 = lying flat on the ground.*

NS= no statistical difference.

Disclaimer: This data was generated during a single growing season which does not constitute a solid trend. Readers should seek additional data and information from other sources.

2014 Roundup Ready Canola Variety Trial **North Central Research Extension Center—Minot**

Company	Variety	Days to Bloom	Bloom Duration	Days to Maturity	Plant Height	Lodging	Oil Content	Seed Yield		
								2014	2 yr avg.	3 yr avg.
		DAP[1]	days	DAP[1]	inches	0-9[2]	%	pounds / acre		
BrettYoung	6070 RR	45	24	97	49	2	45.4	2435	2591	2182
BrettYoung	6044 RR	49	21	97	48	0	44.7	3019	2858	--
BrettYoung	6056 RR	49	21	100	49	1	43.5	2744	--	--
Cargill	V12-1	50	19	97	51	0	44.6	2461	2713	2144
Cargill	09H7763	49	23	98	47	1	44.8	2685	--	--
Cargill	08H0004	54	17	107	54	0	43.0	2667	--	--
Cargill	09H7757	51	20	99	50	0	43.5	2458	--	--
Croplan	HyCLASS 930	43	26	95	41	4	46.2	2606	2529	2181
Croplan	HyCLASS 955	47	22	95	45	4	46.1	2886	2612	2148
Croplan	HyCLASS 969	47	22	97	44	2	46.2	2733	2633	--
Dekalb	DKL70-07	46	23	96	44	2	44.9	2610	2549	2255
Dekalb	DKL30-42	47	22	96	47	4	44.4	2379	2224	1945
Dekalb	DKL55-55	44	26	96	43	5	43.4	2021	2021	1753
Dekalb	DKL38-48	48	22	96	45	1	44.7	2671	2727	--
Dekalb	75-54RR	48	22	99	45	1	44.1	2793	--	--
Dekalb	DKL30-03	41	29	95	42	5	45.5	2429	--	--
DL Seeds	13DL30507	52	23	107	48	0	43.8	2911	--	--
Integra	7150	46	23	96	40	5	44.6	2329	2287	--
Mycogen	Nexera 1012 RR	52	22	107	45	1	41.5	2503	2461	2054
Mycogen	Nexera 1016 RR	50	20	100	44	1	43.4	2046	2267	1840
Mycogen	G2537367H	51	19	101	48	1	42.1	2658	--	--
Proseed	300 Mag	47	23	97	46	1	44.9	2885	2737	2088
Proseed	44 Mag	48	21	97	44	1	45.3	2602	2795	--
Star Specialty Seed	Star 402	46	23	96	41	2	47.2	2411	2491	2039
Mean		48	22	98	46	2	44.4	2549	--	--
C.V.%		1.9	6.4	1.4	8.2	57	2.1	10.7	--	--
LSD 10%		1	2	2	4	1	1.1	322	--	--

[1] DAP = Days after planting. *[2] Lodging: 0 = none, 9 = lying flat on the ground.*

Trial was planted on May 15 with a seeding rate of 8 lbs/A and harvested on September 6.

Previous Crop: 2013 = spring wheat, 2012 = durum, 2011 = winter wheat.

Soil Type: Williams Loam

Oil content and seed yields are adjusted to 8.5% moisture.

2014 Non-Roundup Ready Canola Variety Trial **North Central Research Extension Center—Minot**

Company	Variety	Herbicide System	Days to Bloom	Bloom Duration	Days to Maturity	Plant Height	Oil Content	Seed Yield
			DAP[1]	days	DAP[1]	inches	%	lbs/A
Mycogen Seeds	Nexera 2012 CL	Clearfield	48	18	100	53	43.2	2238
Mycogen Seeds	CL2537382H	Clearfield	49	19	99	53	44.8	2284
Mycogen Seeds	CL2537385H	Clearfield	44	22	100	52	44.1	2258
Mycogen Seeds	Nexera 2020 CL	Clearfield	48	19	100	48	45.6	1994
Bonis & Co.	BC1212	Liberty	42	26	93	49	42.7	2672
Bayer CropScience	InVigor L130	Liberty	45	21	93	54	43.4	2344
Bayer CropScience	InVigor L120	Liberty	44	21	92	53	43.5	2384
Bayer CropScience	InVigor L252	Liberty	49	20	100	53	45.6	2345
Bayer CropScience	InVigor 5440	Liberty	48	21	96	60	43.0	2570
Bayer CropScience	InVigor L140p	Liberty	45	20	93	55	44.0	2770
Bayer CropScience	InVigor L135c	Liberty	46	21	93	56	41.6	2475
Bayer CropScience	InVigor L156h	Liberty	47	21	100	52	43.5	2222
RR check	DK 38-48	Roundup	42	26	92	50	44.8	2679
Trial Mean			46	21	96	53	43.8	2403
C.V.%			2.2	4.8	1.1	6.8	1.2	7.7
LSD 10%			1	1	1	4	0.6	222

[1] *DAP = Days after planting.*

Trial was planted on May 21 with a seeding rate of 8 lbs/A and harvested on September 6.
Previous Crop: spring wheat
Soil Type: Williams Loam
Oil content and seed yields are adjusted to 8.5% moisture.

2013 Canola POST Applied Fertilizer Trial **North Central Research Extension Center—Minot**

Product	Formula Analysis	Product Rate	Crop Injury	Days to Bloom	Bloom Duration	Plant Height	Oil Content	Seed Yield
			%	DAP[1]	days	inches	%	lbs/A
Untreated*			0	48	24	37	45.4	2530
Urea	46-0-0	100 lbs/A	0	48	24	40	41.5	2688
28% UAN	28-0-0	6 qt/A	0	47	24	41	45.3	2632
N-Sure**	28-0-0	8 qt/A	0	48	23	38	44.9	2836
KTS**	0-0-25-17S	10 qt/A	0	48	24	38	44.7	2603
K-Row 23**	0-0-23-8S	10 qt/A	0	48	25	35	42.9	2785
MagThio**	0-0-10S-4Mg	6 qt/A	0	48	24	35	45.7	2639
AMS	21-0-0-24S	6 qt/A	0	48	23	41	46.1	2411
Trial mean			0	48	24	38	44.6	2641
C.V.%			0.0	1.1	4.0	5.2	4.0	5.7
LSD 10%			NS	1	1	2	2.1	182

[1] *DAP = Days after planting.*

**70 lbs/A residual soil N and 23 lbs/A residual soil S @ 0-24"*

Planting Date: May 16, 2013
Variety: Croplan HyCLASS 947
Planting Rate: 685,000 PLS/A
Fertilizer treatments were applied on June 18, just prior to bolting.
Harvest Date: Sept. 6, 2013
Previous Crop: durum
Soil Type: Williams Loam
Oil content and seed yields are adjusted to 8.5% moisture.
***Product manufactured and marketed by Tessenderlo Kerley*

2013 Canola Planting Date Trial **North Central Research Extension Center—Minot**

Planting Date	Harvest Date	Variety*	Date of 1st Bloom	Date of Last Bloom	Maturity Date	Lodging	Test Weight	Oil Content	Seed Yield
						0-9**	lbs/bu	%	lbs/A
May 13	Sept. 6	RR	June 25	July 24	Aug. 27	4	55.2	43.4	2364
		LL	June 26	July 22	Aug. 25	3	55.9	41.8	2179
May 23	Sept. 6	RR	July 4	July 24	Aug. 27	3	55.5	44.7	1951
		LL	July 4	July 24	Aug. 28	2	55.8	41.2	2546
June 3	Sept. 25	RR	July 10	Aug. 11	Sept. 7	1	56.6	45.9	2268
		LL	July 10	Aug. 9	Sept. 5	0	55.3	43.0	2003
June 11	Sept. 25	RR	July 15	Aug. 14	Sept. 9	2	55.7	45.2	1983
		LL	July 17	Aug. 15	Sept. 10	2	54.5	42.1	1646
June 19	Sept. 25	RR	July 22	Aug. 20	Sept. 13	1	53.5	45.4	1267
		LL	July 24	Aug. 20	Sept. 13	2	53.8	42.2	1130
C.V.%			0.1	0.1	0.2	66	1.2	1.9	6.5
LSD 10%			1	1	2	2	0.8	0.9	151

**Variety: RR = HyCLASS 947, LL = InVigor 8440*

***Lodging: 0 = none, 9 = lying flat on the ground.*

Combined Means—Planting Date

Planting Date	Harvest Date	Date of 1st Bloom	Date of Last Bloom	Maturity Date	Lodging	Test Weight	Oil Content	Seed Yield
					0-9**	lbs/bu	%	lbs/A
May 13	Sept. 6	June 25	July 23	Aug. 26	4	55.5	42.6	2272
May 23	Sept. 6	July 4	July 24	Aug. 27	2	55.7	42.9	2248
June 3	Sept. 25	July 10	Aug. 10	Sept. 6	0	56.0	44.4	2135
June 11	Sept. 25	July 16	Aug.14	Sept. 9	2	55.1	43.6	1815
June 19	Sept. 25	July 23	Aug. 20	Sept. 13	2	53.7	43.8	1199
LSD 10%		1	1	1	1	0.7	1.5	189

***Lodging: 0 = none, 9 = lying flat on the ground.*

Seeding Rate: 10 lbs/A
Previous Crop: durum
Soil Type: Williams Loam
Oil content and seed yields are adjusted to 8.5% moisture.

Summary: The 2013 growing season was generally cool and wet with a total of 3 days where temperatures hit 90 degrees or higher and therefore heat and moisture stress were not an issue. Test weight and oil content tended to increase with later planting dates. Seed yield was similar for the first three planting dates and fell off sharply at and after the June 11 planting date.

2013 Canola Row Spacing x Seeding Rate Trial
North Central Research Extension Center, Minot

Row Spacing	Seeding Rate	Days to Bloom	Duration of Bloom	Oil Content	Seed Yield
inches	1000's	DAP*	days	%	lbs/A
7	300	44	25	42.9	2348
7	450	44	26	41.8	2715
7	600	44	24	43.6	2177
7	750	44	25	41.9	2196
15	300	44	26	40.3	2561
15	450	44	25	42.0	2252
15	600	44	25	42.1	2387
15	750	44	26	40.8	2426
30	300	44	26	38.9	2208
30	450	44	24	40.0	2101
30	600	44	26	38.7	2188
30	750	44	27	40.8	2018
C.V.%		0.0	4.4	4.0	10.5
LSD 10%		NS	1	2.0	289

Combined Means—Row Spacing

Row Spacing	Days to Bloom	Duration of Bloom	Oil Content	Seed Yield
inches	DAP*	days	%	lbs/A
7	44	25	42.5	2359
15	44	25	41.3	2407
30	44	26	39.6	2129
LSD 10%	NS	NS	1	158

Oil content decreased as row width increased. Seed yield was similar for 7 and 15 inch rows and significantly higher than the 30 inch row spacing.

Combined Means—Seeding Rate

Seeding Rate	Days to Bloom	Duration of Bloom	Oil Content	Seed Yield
1000's	DAP*	days	%	lbs/A
300	44	26	40.7	2372
450	44	25	41.3	2356
600	44	25	41.5	2251
650	44	26	41.1	2213
LSD 10%	NS	1	NS	NS

Oil content and seed yields were not statistically different for seeding rates.

**Days after planting.*

Planting Date: May 17, 2013
Harvest Date: September 6, 2013
Soil Type: Williams Loam
Variety: HyCLASS 947
Previous Crop: durum

Flax Variety Descriptions

Variety[1]	Origin[2]	Year Released	Relative Maturity	Seed Color	Plant Height	Wilt[3]
Carter	ND	2004	Med.	Yellow	Med.	MS/MR
Cathay	ND	1998	Med.	Brown	Med.	MR
CDC Arras	Can.	1999	Med.	Brown	Med.	MR
CDC Bethune	Can.	1999	Med.late	Brown	Med.tall	MR
CDC Glas	Can.	2012	Med.	Brown	Med.tall	MR
CDC Mons	Can.	2003	Med.late	Brown	Med.	MR
CDC Neela	Can.	2013	Med. Late	Brown	Med.	MR
CDC Sanctuary	Can.	2012	Med.	Brown	Med.tall	MR
CDC Sorrel	Can.	2007	Med.late	Brown	Med.tall	MR
Gold ND	ND	2014	Med.	Yellow	Med.tall	MR/R
Hanley	Can.	2002	Med.early	Brown	Med.	R
Lightning	Can.	2002	Late	Brown	Med. tall	R
Linott	Can.	1966	Med.early	Brown	Med.	MS/MR
McGregor	Can.	1980	Late	Brown	Med.tall	MR
Neche	ND	1988	Med.	Brown	Med.	MR/R
Nekoma	ND	2002	Late	Brown	Med.	MR
Omega	ND	1989	Med.	Yellow	Med.	MS/MR
Pembina	ND	1998	Med.	Brown	Med.	MR
Prairie Blue	Can.	2003	Med.late	Brown	Med.tall	MR
Prairie Grande	Can.	2008	Med.early	Brown	Med.	MR
Prairie Sapphire	Can.	2012	Med.	Brown	Med.	MR
Prairie Thunder	Can.	2006	Med.	Brown	Short	MR
Rahab 94	SD	1994	Med.	Brown	Med.	MR
Selby	SD	2000	Late	Brown	Tall	MR
Shape	Can.	2010	Med.	Brown	Med.	R
Webster	SD	1998	Late	Brown	Tall	MR
York	ND	2002	Late	Brown	Med.	MR/R

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

[2] Can. = Canada, ND = North Dakota State University, SD = South Dakota State University.

[3] R = resistant, MR = moderately resistant, MS = moderately susceptible.

Note: Published in NDSU publication A-1105 (revised).

2014 Flax Variety Trial **North Central Research Extension Center—Minot**

Variety	10% Bloom	Plant Height	Test Weight	Seed Yield 2012	2013	2014	2 yr Avg.	3 yr Avg.
	DAP[1]	inches	lbs/bu	bushels per acre				
Neche	51	31	51.3	30.9	31.6	25.5	28.6	29.3
Rahab 94	51	28	50.8	33.8	27.1	25.2	26.2	28.7
Nekoma	52	30	52.3	35.3	26.2	22.1	24.2	27.9
Carter	50	29	52.1	34.9	21.4	25.5	23.5	27.3
McGregor	51	28	51.7	26.3	31.8	23.3	27.6	27.1
CDC Sorrel	56	31	52.0	29.6	26.8	24.9	25.8	27.1
Pembina	54	30	52.4	32.4	32.6	15.1	23.9	26.7
CDC Sancturary	51	31	51.9	28.3	26.6	24.8	25.7	26.6
Prairie Thunder	51	31	51.8	28.9	26.1	23.6	24.8	26.2
Webster	53	32	52.5	31.2	23.3	23.9	23.6	26.2
GoldND	54	31	52.8	26.9	25.0	26.0	25.5	26.0
Lightning	51	30	51.7	30.3	21.0	24.8	22.9	25.4
Omega	49	28	52.4	30.4	22.7	22.3	22.5	25.2
Shape	49	30	50.2	30.7	20.4	24.2	22.3	25.1
Prairie Sapphire	49	27	50.1	29.3	22.4	20.1	21.2	23.9
Prairie Grande	48	28	51.1	29.0	21.0	21.5	21.3	23.9
Linott	51	31	52.0	31.5	16.0	23.3	19.6	23.6
Hanley	51	31	51.9	25.0	20.3	25.3	22.8	23.6
CDC Arras	50	31	51.7	21.7	26.8	22.2	24.5	23.6
Prairie Blue	51	29	52.0	28.4	23.7	18.4	21.0	23.5
CDC Glas	55	29	51.1	21.3	21.6	26.2	23.9	23.0
CDC Bethume	51	32	52.0	27.7	17.3	23.8	20.5	22.9
York	50	29	51.0	23.1	19.0	23.7	21.4	21.9
Bison	50	31	51.9	--	--	25.3	--	--
Neela	55	28	51.5	--	--	21.8	--	--
Trial Mean	52	30	51.6	30.0	24.2	23.6	--	--
C.V.%	1.2	5.9	1.7	11.2	18.0	12.5	--	--
LSD 10%	1	2	1.0	4.0	5.9	3.4	--	--

[1] *Days after Planting*

Planting Date: May 21 *Harvest Date: September 12*

Seeding Rate: 4 million PLS/A (approx. 40 lbs/A)

Previous Crop: 2011 = Summer Fallow, 2012 = durum, 2013 = spring wheat

Soil Type: Williams Loam

2014 Nitrogen Fertility and Fungicide Interactions in Flax at Minot

This trial was designed to investigate interactions between levels of nitrogen fertility and the timing of fungicide applications on flax in order to define optimal production practices with these inputs.

N Fert Levels	Fungicide Timing[b]	Days to Bloom	Days to Mature	Plant Height	Lodging	Test Weight	Oil Content	Yield
lbs N / A[a]		DAP[c]	DAP[c]	inches	0-9[d]	lbs/bu	%	bu/A
25	untreated	55	96	31	1.5	52.4	41.9	22.3
	w / herb	55	97	29	0.8	52.5	42.9	21.2
	10% blm	55	95	30	0.0	53.3	43.9	23.8
	100% blm	54	96	31	0.5	53.9	43.9	20.8
75	untreated	55	98	30	0.8	53.6	42.7	24.1
	w / herb	55	96	30	0.3	53.4	42.4	23.7
	10% blm	55	96	32	0.5	52.9	43.3	25.8
	100% blm	55	97	30	0.5	53.8	43.0	32.4
125	untreated	55	102	32	2.5	53.0	41.7	23.9
	w / herb	55	101	30	1.5	53.1	41.1	21.5
	10% blm	55	99	30	1.0	52.6	42.3	23.9
	100% blm	55	100	31	1.3	52.7	42.4	25.6
C.V.%		1	2	4.4	141	1.4	2.8	9.7
LSD 10%		NS	2	2	1.5	0.9	1.4	2.8

Nitrogen Fertility Comparisons

N Fert Levels	Days to Bloom	Days to Mature	Plant Height	Lodging	Test Weight	Oil Content	Yield
lbs N / A[a]	DAP[c]	DAP[c]	inches	0-9[d]	lbs/bu	%	lbs/A
25	54	96	30	0.7	53.0	43.1	22.0
75	55	97	31	0.5	53.4	42.8	26.5
125	55	100	31	1.6	52.9	41.9	23.7
LSD 10%	NS	1	NS	0.7	NS	0.7	1.9

Timing of Fungicide Application Comparisons

Fungicide Timing[b]	Days to Bloom	Days to Mature	Plant Height	Lodging	Test Weight	Oil Content	Yield
	DAP[c]	DAP[c]	inches	0-9[d]	lbs/bu	%	lbs/A
Untreated	55	98	31	1.5	53.0	42.1	23.4
w/herb	55	98	30	0.8	53.0	42.1	22.1
10% blm	55	97	30	0.5	53.0	43.2	24.5
100% blm	55	98	31	0.8	53.5	43.1	26.3
LSD 10%	NS	NS	NS	0.9	NS	0.9	2.4

[a] Nitrogen fertility levels = residual soil N + lbs of actual N applied as urea (46-0-0) prior to planting.

[b] Fungicide Timing: 8 oz/A Headline applied with grass herbicide, at 10% bloom and at full bloom.

[c] DAP = days after planting.

[d] Lodging: 0 = none, 9 = lying flat on the ground.

NS= no statistical difference.

Planting Date: May 27 *Variety = York* *Planting Rate: 40 lbs/A*

Harvest Date: October 8 *Previous Crop: spring wheat* *Soil Type: Williams Loam*

Conclusions: Interactions between nitrogen fertility levels and the timing of fungicide applications were not detected and therefore these inputs should be managed independantly. High levels of nitrogen caused delays in crop maturity, increased lodging, had lower levels of oil and did not enhance yields over the lower nitrogen levels. The timing of fungicide applications appear to have had an effect on oil content with slightly increased levels when Headline was applied during flowering. A fungicide application at 100% bloom ehnanced yields over the untreated check by 12%.

2014 Navy Bean Variety Trial at Minot

Variety	100 Seed wt.	Test Weight	Seed Yield 2012	Seed Yield 2014	Seed Yield 2 year
	grams	lbs/bu	pounds per acre	pounds per acre	pounds per acre
Avalanche	16.9	62.9	3223	1696	2460
Vista	14.1	62.2	3117	1185	2151
HMS Medalist	14.0	63.4	3027	1083	2055
Ensign	18.9	63.1	2662	1367	2014
Norstar	15.9	63.7	2456	1199	1828
T9905	17.4	63.1	--	1153	--
Trial Mean	16.2	63.1	2912	1281	--
C.V. %	2.2	0.3	5.0	13.1	--
LSD 10%	0.4	0.2	178	209	--

Planting Date: May 30
Harvest Date: October 15
Seeding Rate: 100,000 live seeds / Acre (approx. 60 lbs/A).
Row Spacing: 30"
Previous Crop: 2011 = summer fallow, 2013 = barley
Soil Type: Williams Loam

2014 Pinto Bean Variety Trial at Minot

Variety	100 Seed wt.	Test Weight	Seed Yield 2012	Seed Yield 2014	Seed Yield 2 year
	grams	lbs/bu	pounds per acre	pounds per acre	pounds per acre
LaPaz	35.0	63.2	3008	1574	2291
Lariat	36.7	62.0	2827	1440	2133
Stampede	32.3	61.9	2632	1416	2024
Windbreaker	35.2	60.6	2574	1437	2006
Maverick	35.5	62.0	2486	1085	1785
Sinaloa	33.8	62.6	--	1126	--
Trial Mean	34.5	61.8	2620	1374	--
C.V. %	2.1	0.4	5.1	10.1	--
LSD 10%	0.9	0.3	161	166	--

Planting Date: May 30
Harvest Date: October 15
Seeding Rate: 100,000 live seeds / Acre (approx. 60 lbs/A).
Row Spacing: 30"
Previous Crop: 2011 = summer fallow, 2013 = barley
Soil Type: Williams Loam

2014 Dry Pea - Minot - Authors, T. Stefaniak, K. McPhee and E. Eriksmoen

Variety	Days to Flower	Days to PM	Vine Length[1]	Canopy Height[2]	Height Index[3]	Seed Protein	Seeds/ Pound	1,000 Seed Weight	Test Weight	Seed Yield 2014	Seed Yield 3-yr Avg.
	(DAP)[4]	(DAP)[4]	(inches)	(inches)	(%)	(%)		(grams)	(lb/bu)	---(bu/a)---	
Yellow Cotyledon Type											
AGASSIZ	45	85	37	16	43	26.5	2023	228	62.0	51.1	53.9
BRIDGER	43	81	28	22	79	25.3	2003	228	63.9	25.7	45.2
CDC MEADOW	45	83	33	17	51	24.4	2235	205	63.7	28.0	45.6
CM1609	50	82	31	26	83	24.2	2007	238	63.8	32.3	--
CM3404	48	86	33	20	63	25.1	1576	290	63.1	31.3	--
DS ADMIRAL	45	81	32	15	48	24.8	2065	222	62.7	38.4	48.7
DURWOOD	44	88	35	25	74	26.1	1804	253	63.2	38.1	--
EARLYSTAR	45	85	32	17	55	24.1	2202	207	63.0	33.1	--
GUNNER	45	87	33	19	60	25.5	2080	219	62.7	29.4	--
HYLINE	45	84	34	23	70	23.8	1854	248	63.1	33.5	--
JETSET	45	82	33	22	68	26.3	1952	234	63.2	40.5	--
LN4228	40	86	34	18	74	26.2	1817	251	64.1	35.4	--
LN4236	45	85	10	16	62	27.0	1770	259	62.6	36.1	--
MS001	45	85	25	16	55	24.3	1921	238	62.8	39.9	--
N08056-092	42	81	28	15	67	26.1	2055	222	63.5	37.2	--
N08056-099	43	88	41	27	74	26.5	1898	240	63.9	20.9	--
NAVARRO	39	82	29	22	54	26.8	1842	251	63.0	29.3	44.9
NETTE	43	81	24	20	81	25.2	1980	230	63.8	37.6	--
QUANTIM	48	84	37	16	48	24.9	1733	272	61.9	44.2	--
SALAMANCA	46	82	36	23	63	26.6	1839	248	62.2	37.0	--
SPIDER	45	87	31	17	56	25.8	1848	249	63.0	28.3	49.9
TORCH	45	86	26	21	81	24.4	1795	254	63.4	17.5	41.3
TRAPEZE	43	84	26	14	57	25.8	1864	246	62.5	22.1	--
UN F377	42	84	31	19	64	23.8	1937	237	63.2	24.4	--
VEGAS	45	90	32	22	67	28.6	1858	245	62.7	34.1	--
YELLOWSTONE	41	81	30	27	96	25.0	1635	281	63.0	34.7	--

2014 Dry Pea - Minot - Authors, T. Stefaniak, K. McPhee and E. Eriksmoen—Continued

Variety	Days to Flower	Days to PM	Vine Length[1]	Canopy Height[2]	Height Index[3]	Seed Protein	Seeds/ Pound	1,000 Seed Weight	Test Weight	Seed Yield 2014	Seed Yield 3-yr Avg.
	(DAP)[4]	(DAP)[4]	(inches)	(inches)	(%)	(%)		(grams)	(lb/bu)	---(bu/a)---	
Green Cotyledon Type											
ARAGORN	42	79	25	16	63	26.4	2247	203	62.4	27.2	--
ARCADIA	43	82	25	12	55	24.2	2026	225	63.3	36.8	--
BLUEMOON	45	82	29	17	61	24.3	1782	262	63.1	28.1	43.7
CDC STRIKER	44	84	24	11	50	23.8	2105	219	62.6	26.7	43.6
CRUISER	45	84	33	13	43	25.7	2270	201	62.1	32.5	38.7
DAYTONA	45	84	30	18	64	25.4	1690	269	62.7	36.0	--
GINNY	46	82	26	15	56	25.2	2084	225	62.7	31.2	--
GREENWOOD	44	82	31	15	49	23.9	2162	211	63.4	37.1	--
K2	42	82	29	17	59	25.1	2169	211	62.8	30.3	--
LN1109	46	85	26	17	25	24.7	1562	291	63.3	21.1	--
LN1115	45	83	30	15	52	26.9	1909	242	63.1	40.0	--
LN1123	46	86	29	17	58	25.6	1991	231	63.5	32.0	--
MAJORET	48	86	26	19	60	26.2	1856	245	62.6	21.8	40.7
SHAMROCK	48	86	33	21	66	25.3	1950	234	62.6	38.4	--
VIPER	42	80	27	19	70	26.9	1976	230	62.6	29.8	--
GRAND MEAN	44	84	30	18	62	25.3	1941	238	63.0	32.4	
CV	4.9	4.9	19.9	22.0	32.1	3.8	8.8	9.0	0.8	40.8	
LSD (10%)	2	4	5	4	18	1.0	156	20	1.0	12.0	

Planted: May 2, 2014; harvested Sept. 2, 2014
Previous crop: Hard red spring wheat
[1] *Plant height at end of flowering*
[2] *Height of canopy at harvest*
[3] *Calculated as the ratio of canopy height/plant height*
[4] *Days after planting*

Flea Beetle Management in Canola with Insecticides

Venkat R Chapara, Area Extension Specialist/Crop Protection

Objective: To evaluate the efficacy of contemporary insecticides to manage flea beetle damage in canola.

Methodology:

Location: NCREC, Minot, ND
GPS Coordinates: N: 48.17178 W: -101.28726
Previous Crop: Hard Red Spring Wheat
Tillage: No-Till
Design: Randomized Complete Block Design with 4 replications
Plot Dimensions: 10*25 sq. ft.
Cultivar: RG662 (NDSU)
Seed Rate: 685000 PLS/ac
Planting Date: May 16, 2014
Date of Emergence: May 21, 2014
Insect Pests to Evaluate: Flea beetles, army worms, aphids, diamond back moth and weevils.
Insect Pests observed: Only flea beetle incidence was observed above Economic Threshold level (ETL >25%) no other insect pests made their appearance in the entire crop season.
Insecticide application Date: June 6, 2014
Other Practices: All the agronomic practices such as fertilizers, weedicides were applied at recommended timings of the crop season as per the crop production recommended practices.
Date of Harvest: September 26, 2014

Results:

Table 1: Efficacy of various insecticides in controlling flea beetles leaf defoliation on reaching ETL (>25%) at 1, 2, and 3 weeks after application and their impact on yield of canola.

Treatments	Dosage@ Fl. oz/ac	At Application*	Week after Application*	2 weeks after Application*	3 weeks after Application*	Yield (lbs/ac)
Non-Treated	--	32.98	24.58	23.32	25.34	681.89
Endigo ZCX	4	33.75	16.46	18.13	8.54	719.39
Besiege	9	32.08	18.75	17.71	7.25	794.67
Warrior II	1.92	31.25	14.48	17.29	6.29	753.35
Baythroid XL	2.8	33.49	19.37	12.56	5.89	736.59
Capture	2.6	33.96	21.56	20.01	10.81	655.31
LSD (P=.05)	**--**	**3.55**	**5.98**	**8.14**	**3.55**	**139.80**
CV%	**--**	**7.15**	**20.7**	**29.71**	**7.24**	**2.16**

***** Leaf defoliation

Management of Hard Red Spring Wheat Diseases with Foliar Fungicides

Venkat R Chapara, Area Extension Specialist/Crop Protection

Objective: To evaluate the efficacy of available foliar fungicides to manage foliar and head scab diseases in hard red spring wheat.

Methodology:

Location: NCREC, Minot, ND
GPS Coordinates: N: 48.18023 W: -101.30244
Previous Crop: Hard Red Spring Wheat
Tillage: Conventional Tillage
Design: Randomized Complete Block Design with 5 replications
Plot Dimensions: 10*30 sq. ft.
Cultivar: Elgin ND
Planting Date: May 22, 2014
Seed Rate: 90 lbs/ac
Diseases to Evaluate: Tan Spot, Septoria Leaf Spot, Rust and Fusarium Head Scab
Inoculation Methods: None
Diseases observed: Among foliar disease only Tan Spot incidence and severity were in significant amounts. Fusarium Head Scab was the major Head Disease in this trial.
Other Practices: All the agronomic practices such as fertilizers, weedicides were applied at recommended timings of the crop season as per the crop production recommended practices.
Fungicides Timing: First Spray at early tillering stage along with herbicides (due to excessive wet conditions application was delayed); second spray (Aproach Prima) at feeks 9.
Harvest Date: September 22, 2014

Results:

Table 1: Efficacy of various fungicides in managing tan spot and Fusarium head scab and their impact on yield of hard red spring wheat cultivar Elgin.

Treatments	Dosage@ Fl. oz/ac	Tan Spot Incidence*	Tan Spot Severity*	FHB Incidence*	FHB Severity*	Yield in (bu /ac)
Non-Treated	--	55.6	5.47	23	10.27	38.6
QuiltXcel	5	49.4	3.82	9	6.17	39.4
Aproach	3	53.2	4.68	10.6	5.09	40
Tilt	4	51.2	10.94	12.4	6.83	39
Folicur	4	51.6	4.15	11.2	8.23	38.6
Aproach Prima*	6.8	50.4	4.48	9.0	6.32	40.6
Aproach + Aproach Prima*	3 6.8	42.6	3.71	6.8	2.9	42.2
LSD (P=.05)	**--**	**4.17**	**0.82**	**4.33**	**4.78**	**3.2**
CV%	**--**	**6.31**	**14.25**	**33.39**	**29.75**	**6.17**

***** Treatments applied at feeks 9 with Non-Ionic Surfactant @ 0.25% v/v added to them.

Management of White Mold in Dry Beans with Foliar Fungicides

Venkat R Chapara, Area Extension Specialist/Crop Protection

Objective: To evaluate the efficacy of available foliar fungicides to manage white mold of dry beans.

Methodology:

Location: NCREC, Minot, ND
GPS Coordinates: N: 48.17178 W: -101.28726
Previous Crop: Sunflower with heavy incidence of White Mold
Tillage: No-Till
Design: Randomized Complete Block Design with 4 replications
Plot Dimensions: 5*25 sq. ft.
Spacing: 21 inch between the rows
Cultivar: Stampede
Planting Date: June 4, 2014
Seed Rate: 75000 plants/acre
Diseases to Evaluate: White Mold
Inoculation Methods: None
Diseases observed: White Mold incidence
Other Practices: All the agronomic practices such as fertilizers, weedicides were applied at recommended timings of the crop season as per the crop production recommended practices.
Fungicides Timing: First Spray at bloom initiation (8/1/14); second spray: 14 days after the first spray (8/14/14).
Harvest Date: October 8, 2014

Results:

Table 1: Efficacy of various fungicides in managing White Mold incidence in Dry Beans and their impact on yield parameters.

Treatments*	Dosage@ Fl. oz/ac	White Mold Incidence*	Yield in (lb /ac)
Non-Treated	--	20.1	2570.5
Aproach	9	17.22	3407.5
Aproach+Topsin	9+20	9.58	3221.7
Aproach+Topsin	9+30	4.8	3278.2
Topsin	30	12.7	2899.1
LSD (P=.05)	**--**	**10.64**	**1096.7**
CV%	**--**	**53.65**	**23.14**

** Non-Ionic Surfactant @ 0.25% v/v was added to each fungicidal treatment.*

Control of emerged kochia in a spring burndown

The objective of the study was to evaluate alternative methods for controlling emerged kochia in a spring burndown that may be glyphosate-resistant. There was no crop planted in the field. Herbicide treatments were applied June 5 to 0.5- to 4-inch kochia with about 12 plants/ft^2. All treatments were applied with recommended adjuvants to enhance foliar control.

Glyphosate provided poor kochia control indicating it may be glyphosate-resistant. Sharpen and any Spartan or Authority product provided good to excellent kochia control through mid-July. Gramoxone provided good kochia control as well. Herbicides with longer residual such as Spartan/Authority provided better long-term control.

Table. Control of emerged kochia in a spring burndown. (1407)

		Kochia contol			
Treatment[a]	Rate/A	Jun-12	Jun-19	Jul-02	Jul-17
		----------%----------			
Untreated		0	0	0	0
Glyphosate[b] + AMS	32 fl oz + 2.5 gal	62	72	59	30
Sharpen + MSO + AMS	2 fl oz + 1% + 2.5 gal	98	98	95	89
Gramoxone + NIS	2 pt + 0.25%	98	97	93	85
Liberty 280 + AMS	29 fl oz + 8.82 gal	83	79	62	33
Spartan + MSO	4 fl oz + 1%	95	91	90	92
Spartan Charge + MSO	5 fl oz + 1%	99	99	97	97
Spartan + Sharpen + MSO	4 fl oz + 1 fl oz + 1%	99	98	97	97
Authority MTZ + MSO	10 oz + 1%	97	97	97	94
Authority MTZ + MSO	12 oz + 1%	97	98	98	95
Authority MTZ + MSO	14 oz + 1%	98	98	98	97
LSD (0.05)		5.9	5.3	4.8	4.2
CV		4.1	3.7	3.5	3.3

[a] *All treatments applied June 5 to 0.5-4 inch kochia (no crop)*

[b] *Glyphosate = 3 lb ae formulation*

Control of emerged kochia using soybean herbicides

The objective of the study was to evaluate alternative methods for controlling emerged glyphosate-resistant kochia in a spring burndown using soybean herbicides. There was no crop planted in the field. Herbicide treatments were applied June 5 to 0.5- to 4-inch kochia with about 12 plants/ft^2. All treatments were applied with recommended adjuvants to enhance foliar control.

Glyphosate + Zidua provided poor kochia control. Kochia control was greater where Metribuzin was applied at 0.5 lb compared to 0.25 lb/A. Verdict tended to provide slightly better kochia control than Sharpen treatments. Treatments containing Spartan/Authority provided excellent kochia control. Fierce was not as effective as the Spartan/Authority treatments. Cadet provided poor kochia control.

Table. Control of emerged kochia in the spring burndown using soybean herbicides. (1437)

		Kochia control			
Treatment[ab]	Rate	Jun-12	Jun-19	Jul-02	Jul-17
(All treatments applied with glyphosate + AMS)		----------%----------			
Zidua	2.5 oz	65	72	66	50
Zidua + Sharpen + MSO	2.5 oz + 1 oz + 1%	93	92	87	81
Zidua + Verdict + MSO	2.5 oz + 5 oz + 1%	99	97	95	90
Zidua + Metribuzin	2.5 oz + 0.5 lb	82	83	83	83
Metribuzin + Sharpen + MSO	0.5 lb + 1 oz + 1%	97	96	95	91
Metribuzin + Verdict + MSO	0.5 lb + 5 oz + 1%	98	98	98	98
Metribuzin + Zidua + Sharpen + MSO	0.5 lb + 2.5 oz + 1 oz + 1%	97	98	97	97
Zidua + Metribuzin	2.5 oz + 0.25 lb	75	74	69	49
Metribuzin + Sharpen + MSO	0.25 lb + 1 oz + 1%	96	95	90	83
Metribuzin + Verdict + MSO	0.25 lb + 5 oz + 1%	97	95	93	84
Metribuzin + Zidua + Sharpen + MSO	0.25 lb + 2.5 oz + 1 oz + 1%	98	97	95	90
Sharpen + Spartan + MSO	1 oz + 4 oz + 1%	99	99	99	99
Authority MTZ + MSO	12 oz + 1%	98	98	99	99
Fierce + MSO	3 oz + 1%	89	94	91	81
Zidua + Cadet + MSO	1.8 oz + 0.42 oz + 1%	79	78	70	48
Untreated		0	0	0	0
LSD (0.05)		2.8	5.0	6.1	6.8
CV		2.0	3.5	4.4	5.3

[a] *All treatments applied with Glyphosate + AMS (22 oz + 2.5 gal/100 gal); Glyphosate = 4.5 lb ae formulation*

[b] *All treatments applied June 5 to 0.5-4 inch kochia (no crop)*

Broadleaf weed control in spring wheat with Huskie and Huskie Complete

The objective of the study was to evaluate broadleaf weed control with Huskie and Huskie Complete compare to competitive standards. Treatments were applied May 16 to 4-leaf wheat, 0.5-7 inch common lambsquarters, and 0.5-7 inch redroot pigweed. All treatments provided excellent control of both weeds. The wheat crop was excellent and effectively shaded out the weeds. Crop injury was evident with the Huskie Complete and WideMatch treatments 2-4 weeks after treatment, but disappeared by early July.

Table. Broadleaf weed control in spring wheat with Huskie and Huskie Complete. (1425)

		Wheat		Weed Control[b]			
		Injury		Rrpw		Colq	
Treatment[a]	Rate	Jun-14	Jul-03	Jul-03	Aug-11	Jul-03	Aug-11
		-------%-------		-------%-------		-------%-------	
Untreated		0	0	0	0	0	0
Huskie + AMS	11 fl oz + 1.47 gal	6	0	100	100	100	100
Huskie + AMS	13.5 fl oz + 1.47 gal	3	0	100	100	100	100
Huskie Complete + AMS	13.7 fl oz + 1.47 gal	23	0	100	100	100	100
WideMatch + MCPA	1 pt + 0.5 pt	2	0	70	100	100	100
Aff TM + WideMatch + NIS	0.6 oz + 1 pt + 0.25%	17	0	83	100	99	100
LSD (0.05)		7.6	NS	4.4	0.9	0.0	0.0
CV		49.0	0.0	3.2	0.6	0.0	0.0

[a] *All treatments applied POST; Aff TM=Affinity TankMix*

[b] *Rrpw=Redroot pigweed; Colq=Common lambsquarters*

Weed control in spring wheat with Varro tank mixes

The objective of the study was to evaluate broadleaf and grassy weed control with Varro tank mixes. All treatments were applied postemergence on May 15 to 4-leaf wheat, 3-leaf wild oat, 0.5-4 inch foxtail, 0.5-2 inch redroot pigweed, and 3-12 inch curly dock. All treatments caused early, temporary chlorosis but the symptoms disappeared by late June. All treatments provided excellent control of all weeds.

Table. Weed control with Varro tank mixes. (1426)

		Wheat			Weed Control[c]							
		Injury			Wild Oat		Green foxtail		Rrpw		Curly dock	
Treatments[abc]	Rate	Jun-12	Jun-17	Jul-02	Jun-17	Aug-09	Jun-17	Aug-09	Jun-17	Jul-02	Jun-17	Jul-02
		----------%----------			----------%----------		----------%----------		-------%-------		------%------	
Untreated		0	0	0	0	0	0	0	0	0	0	0
Bronate + Varro	1 pt + 6.85 oz	10	9	0	84	99	85	97	83	99	67	99
Weld + Varro	1.3 pt + 6.85 oz	11	9	0	85	99	85	98	84	99	87	99
Carnivore + Varro	1 pt + 6.85 oz	9	8	0	85	99	85	98	87	99	68	99
WM + MCPA Ester + Varro	1 pt + 0.5 pt + 6.85 oz	9	8	0	85	99	85	98	86	99	88	99
WM + 2,4-D Ester + Varro	1 pt + 0.5 pt + 6.85 oz	12	8	0	85	99	85	98	87	99	87	99
Affinity + WM + Varro	0.6 oz + 1 pt + 6.85 oz	9	8	0	85	99	85	98	90	99	87	99
Oly + Carnivore + Varro	0.2 oz + 1 pt + 6.85 oz	9	8	0	85	99	85	93	89	99	72	99
Huskie Complete	13.7 oz	9	8	0	85	99	85	92	88	99	87	99
LSD (0.05)		1.6	0.8	NS	1.2	0.0	1.4	3.1	2.5	0.0	4.6	0.0
CV		10.4	6.5	0.0	0.9	0.0	1.1	2.1	1.9	0.0	3.7	0.0

[a] All treatments applied at 3-leaf wild oat

[b] All treatments applied with AMS at 1.47 gal/100 gal

[c] Rrpw=Redroot pigweed; Affinity=Affinity TankMix; WM=WideMatch; Oly=Olympus

Wild oat control in Liberty Link canola

The objective of the study was to evaluate wild oat control in Liberty Link canola with Liberty and Select Max. All treatments were applied June 10 to cotyledon- to 3-leaf canola and 3-leaf wild oat. None of the treatments caused visible crop injury. All treatments provided excellent wild oat control. Liberty is more effective with warm, humid conditions and plenty of sunlight. Liberty can be effective on annual grasses, but should be applied when grasses are small. Tank mixing Liberty and Select has provided good grass control in previous studies.

Table. Wild oat control in Liberty Link canola. (1430)

		Canola Injury		Weed Control Wild oat		
Treatments[a]	Rate	Jun-17	Jun-23	Jun-23	Jul-08	Jul-30
		------%-------		----------%----------		
Untreated		0	0	0	0	0
Liberty + AMS	22 oz + 4.41 gal	0	0	89	92	98
Liberty + AMS	29 oz + 4.41 gal	0	0	92	92	93
Liberty + Select Max + AMS	22 oz + 6 oz + 4.41 gal	0	0	98	94	100
Select Max + NIS	12 oz + 0.25%	0	0	86	92	100
LSD (0.05)		NS	NS	25.9	7.0	4.9
CV		0	0	20.2	5.0	3.3

[a] *All treatments applied at 3-leaf wild oat*

Barley tolerance to preemergence herbicides

Some green foxtail populations across North Dakota are known to be resistant to Group 1 herbicides like Puma, Discover, and Axial XL. The objective of the study was to evaluate barley tolerance to soil-applied preemergence herbicides for foxtail control. This study was conducted in 2012 and 2014. All treatments were applied preemergence (after barley was planted). In 2012, Dual, Pre-Pare, and Valor caused early moderate crop injury; however, the crop generally recovered by mid-July. Zidua, Warrant, and Prowl caused minimal crop injury in 2012. In contrast, Zidua and Warrant caused slight to moderate crop injury in 2014. Pre-Pare and Prowl caused only slight crop injury in 2014. Valor caused moderate crop injury both years. Dual and Outlook caused severe injury in 2014. Despite crop injury in 2012, there was minimal effect on crop yield. In 2014, only Dual and Outlook reduced barley yield.

Table 1. Barley tolerance to preemergence herbicides in 2012. (1208)

		Barley					
		Injury				Yield	Test wt.
Treatment[a]	Rate	5-Jun	25-Jun	11-Jul	21-Jul	6-Aug	6-Aug
		----------%----------				bu/A	lb/bu
Untreated		0	0	0	0	76.3	42.4
Zidua	3 oz	0	0	0	0	70.7	43.3
Warrant	1.5 qt	2	1	1	0	77.6	43.3
Dual II Magnum	1.67 pt	15	13	6	5	74.2	43.1
Pre-Pare	0.3 oz	25	17	5	3	72.9	42.6
Prowl H2O	3 pt	2	1	0	0	72.4	43.5
Valor	3 oz	30	20	5	2	73.8	42.9
LSD (0.05)		6	5	NS	NS	NS	NS
CV		29	40	139	257	10	3

[a] *All treatments applied PRE*

Table 2. Barley tolerance to preemergence herbicides in 2014. (1408)

		Barley					
		Injury				Yield	Test wt.
Treatment[a]	Rate	Jun-09	Jun-18	Jul-03	Jul-15	Aug-20	Aug-20
		----------%----------				bu/A	lb/bu
Untreated		0	0	0	0	66.4	42.9
Zidua	3 oz	13	14	15	12	70.3	43.7
Warrant	1.5 qt	10	12	12	9	70.2	44.3
Dual II Magnum	1.67 pt	26	49	54	55	64.6	44.2
Pre-Pare	0.3 oz	5	6	7	3	76.3	43.1
Prowl H2O	3 pt	9	7	5	1	71.3	44.5
Valor	2 oz	18	17	17	14	76.4	45.2
Outlook	18 oz	23	42	45	45	60.1	42.4
LSD (0.05)		3.7	14.4	16.4	18.6	9.8	1.3
CV		16.3	44.7	48.1	60.8	8.1	1.7

[a] *All treatments applied PRE*

Dry pea tolerance to Spartan and Sharpen tank mixes

The objective of the study was to evaluate dry pea tolerance to Spartan and Sharpen applied alone or in a tank mix at different rates. All treatments were applied preemergence. Spartan at 3 oz and Sharpen at 1 oz were considered as the 1X rates. Spartan at 3 oz + Sharpen at 2 oz caused 10% injury or less. Rates up to Spartan 6 oz + Sharpen 4 oz caused 10-20% injury. Sharpen applied alone at 6 oz caused up to 26% injury and was the only treatment that caused a yield reduction.

Table. Dry pea tolerance to Spartan and Sharpen tank mixes. (1439)

		Dry pea									
		Injury					Density	Height		Yield	Test wt.
Treatment[ab]	Rate	30-May	10-Jun	27-Jun	10-Jul	8-Aug	12-Jun	Jun-2-	18-Jul	19-Aug	19-Aug
		----------%----------					pl m row	cm		lb/A	lb/bu
Untreated		0	0	0	0	0	10.3	34.4	81.7	3411	66.5
Spartan	3 oz	0	3	2	2	1	9.6	32.0	81.0	3736	66.5
Spartan	6 oz	0	9	7	5	5	11.7	32.4	82.5	3999	66.9
Spartan + Sharpen + MSO	3 oz + 1 oz + 1%	0	6	7	8	9	9.9	31.7	83.7	3970	66.3
Spartan + Sharpen + MSO	3 oz + 2 oz + 1%	0	6	8	10	9	10.7	32.7	81.1	3573	66.8
Spartan + Sharpen + MSO	6 oz + 2 oz + 1%	0	13	10	10	11	11	32.9	82.4	3928	66.6
Spartan + Sharpen + MSO	6 oz + 4 oz + 1%	0	17	19	20	19	9.3	28.9	83.3	3834	66.6
Sharpen + MSO	3 oz + 1%	0	6	8	8	8	10	31.2	83.7	3689	66.5
Sharpen + MSO	6 oz + 1%	0	15	17	26	23	8.9	32.6	77.2	2983	66.5
Untreated		0	0	0	0	0	10	33.1	82.9	3366	66.2
LSD (0.05)		NS	2.8	3.8	12.1	13.1	NS	NS	NS	NS	NS
CV		0.0	22.2	28.5	77.7	88.7	12.4	5.5	6.8	11.2	0.6

[a] *All treatments applied PRE*

[b] *All treatments applied with Glyphosate + AMS (32 oz + 2.94 gal/100 gal); Glyphosate = 3 lb ae formulation*

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