

Oakes Irrigation Research Site

Carrington Research Extension Center
North Dakota State University

Garrison Diversion Conservancy District

Summary 2009



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Table 1. Precipitation and temperature at the Oakes Irrigation Research Site.

Month	Precipitation			Average daily temperatures		
	2009	15-year average	25-year average	2009	15-year average	25-year average
	----- inches -----			----- °F -----		
April	1.42	1.34	1.65	42	43	44
May	0.54	3.31	2.98	56	56	57
June	6.53	4.22	3.72	64	66	66
July	2.30	3.07	3.20	67	71	71
August	4.42	2.28	2.66	67	69	68
September	2.23	3.02	2.66	64	60	59
October	4.73	2.50	1.89	40	46	45

Table 2. Growing degree units¹ at the Oakes Irrigation Research Site.

Month	2009	10-year average	15-year average	25-year average
May	309	296	291	325
June	434	490	495	497
July	529	648	639	627
August	518	573	586	570
September	438	385	377	360
Total	2228	2392	2388	2379

¹Growing degree units = (Temp_{max} + Temp_{min})/2 - 50. If Temp_{max} is greater than 86, then Temp_{max} = 86. If Temp_{min} is less than 50, then Temp_{min} = 50. Temperature is in degrees F.

Table 3. Dates of last and first frosts.

	2009	10-year average	15-year average	25-year average
Last frost in spring				
32 °F or less	May 10	May 3	May 1	May 3
28 °F or less	Apr 10	Apr 27	Apr 26	Apr 28
First frost in fall				
32 °F or less	Oct 8	Oct 4	Oct 3	Sep 30
28 °F or less	Oct 8	Oct 7	Oct 7	Oct 5
Frost free period (days)	151	154	154	150

Barley Variety Trial

Variety	Days to ¹ Head	Plant ² Lodge	Plant Height	Plump >6/64	Thin <5/64	Grain Protein		Test Weight	Grain Yield	
						2009	3-yr Avg.		2009	3-yr Avg.
		0-9	inch	%	%	-----%-----		lb/bu	-----bu/ac-----	
Six Row										
Drummond	59.0	0.5	44.5	96.4	2.8	12.8	12.6	47.7	117.3	108.2
Lacey	59.3	0.8	43.5	96.7	2.8	12.3	12.1	48.4	126.7	113.9
Stellar-ND	59.0	0.0	45.0	96.4	2.9	12.1	12.0	46.9	128.5	113.4
Tradition	59.0	2.0	43.8	96.2	3.2	12.3	12.1	48.0	123.6	112.9
Celebration	59.5	1.8	43.0	95.7	3.6	12.4	--	48.1	131.1	--
Rasmusson	59.3	1.0	42.3	95.8	3.5	11.6	--	47.9	137.0	--
Two Row										
Pinnacle	60.8	1.5	41.8	97.0	2.4	10.8	--	47.1	120.7	--
MEAN	59.4	1.1	43.4	96.3	3.0	12.0		47.7	126.4	
CV %	0.0	70.3	2.0	0.9	20.6	1.6		0.7	7.6	
LSD.05	NS	1.1	1.3	NS	NS	0.3		0.5	NS	

¹Days from planting to heading.

²Lodging is from 0 to 9; 0 is erect, 9 is flat.

Planting Date = April 22; Harvest Date = August 6; Previous Crop = Soybean.

Fertilizer Rate lb/acre = 111 N, 79 P₂O₅, 52 K₂O, 22 S; Irrigation = 7"

Hard Red Spring Wheat Variety Trial

Variety	Days to ¹ Head	Plant ² Lodge	Plant Height	Grain Protein		1000 KWT	Test Weight	Grain Yield	
				2009	3-yr Avg.			2009	3-yr Avg.
		0-9	inch	-----%-----		gram	lb/bu	-----bu/ac-----	
Bigg Red	64.5	1.3	38.8	12.9	12.6	38.1	59.2	61.8	68.6
Faller	64.8	1.0	37.8	12.3	12.4	41.8	58.2	78.8	75.2
Glenn	62.0	1.5	40.0	13.1	13.4	37.2	59.9	67.5	64.9
Howard	64.3	2.5	37.3	12.8	12.8	39.5	59.2	68.2	70.1
Traverse	62.8	3.3	41.0	12.6	12.5	39.4	55.8	68.0	67.9
Kuntz	64.5	0.0	33.0	12.9	12.8	34.2	58.0	71.1	69.8
Brennan	63.5	0.0	32.0	13.3	--	35.1	57.5	68.6	--
Barlow	62.8	2.5	38.8	13.2	--	39.3	58.3	64.2	--
Pivot	64.3	0.0	29.3	12.7	--	35.0	56.7	71.0	--
Brick	62.0	3.5	40.3	13.0	--	36.7	58.4	61.9	--
MEAN	63.6	1.6	36.8	12.9		37.6	58.1	68.1	
CV %	0.7	56.9	3.5	3.0		2.5	0.8	6.4	
LSD.05	0.7	1.3	1.9	0.6		1.4	0.6	6.3	

¹Days from planting to heading.

²Lodging is from 0 to 9; 0 is erect, 9 is flat.

Planting Date = April 23; Harvest Date = August 22; Previous Crop = Soybean.

Fertilizer Rate lb/acre = 131 N, 79 P₂O₅, 52 K₂O, 22 S; Irrigation = 7"

Pinto Bean Variety Trial

Variety	Days to PM ¹	Seed Weight gram/100	Test Weight lb/bu	Seed Yield	
				2009 -----lb/ac-----	2-yr Avg.
Lapaz	102	32.7	62.1	2926	2901
ND-307	101	36.8	57.8	2646	--
Stampede	99	33.2	59.4	2792	2935
Lariat	102	34.4	60.9	2258	2673
Buster	98	35.8	60.8	3432	3447
GTS-900	101	36.0	61.4	2894	3037
Maverick	97	35.3	58.1	2773	2756
Othello	92	37.2	61.5	2477	2855
Baja	96	32.9	61.3	3004	2538
Durango	99	34.0	59.3	2290	2594
Sonora	101	30.2	61.8	2947	2994
Mariah	100	34.0	61.0	2531	--
Medicine Hat	94	36.8	59.8	3040	--
Windbreaker	95	37.6	59.6	3465	--
Santa Fe	98	40.1	59.6	3018	--
Croissant	100	35.7	61.3	2651	--
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MEAN	98	35.2	60.3	2821	
C.V. %	2	3.6	0.8	10	
LSD .05	2	1.8	0.7	398	

¹Days from planting to mature.

**Planting Date = May 22; Harvest Date = Sept. 4; Previous Crop = HRSW.
Fertilizer Rate lb/acre = 30 N, 43 P₂O₅, 52 K₂O, 22 S; Irrigation = 7.5"**

Navy Bean Variety Trial

Variety	Days to PM ¹	Seed Weight gram/100	Test Weight lb/bu	Seed Yield	
				2009 -----lb/ac-----	2-yr Avg.
Navigator	100	18.2	63.6	2291	2163
Norstar	99	17.9	64.9	1840	2102
Seahawk	102	21.6	64.4	2568	2251
Vista	100	17.5	63.5	2652	2606
Avalanche	99	18.8	63.9	2263	2618
Ensign	98	19.8	63.6	2373	2742
HMS Medalist	99	17.0	64.1	2717	--
Mayflower	102	18.6	63.3	2317	--
Mean	100	18.7	63.9	2378	
C.V.%	1	3.9	0.6	8	
LSD.05	2	1.1	0.6	285	

**Planting Date = May 22; Harvest Date = Sept. 4; Previous Crop = HRSW.
Fertilizer Rate lb/acre = 30 N, 43 P₂O₅, 52 K₂O, 22 S; Irrigation = 7.5"**

Miscellaneous Bean

Variety	Days to PM ¹	Seed Weight gram/100	Test Weight lb/bu	Seed Yield	
				2009 -----lb/ac-----	2-yr Avg.
Eclipse	95	18.0	62.7	2587	2556
Jaguar	98	18.4	63.6	2902	2940
Matterhorn	100	30.8	60.0	2717	2646
Merlot	100	32.1	61.6	2545	2748
Sedona	95	35.5	60.4	2838	3015
T-39	101	19.1	63.3	2602	2668
Zorro	98	19.2	63.0	2925	--
MEAN	98	24.7	62.1	2731	
C.V.%	2	4.4	0.9	10	
LSD .05	3	1.6	0.8	NS	

¹Days from planting to mature.

**Planting Date = May 22; Harvest Date = Sept. 4; Previous Crop = HRSW.
Fertilizer Rate lb/acre = 30 N, 43 P₂O₅, 52 K₂O, 22 S; Irrigation = 7.5"**

Corn Hybrid Performance Trial

Brand	R.M.	Hybrid	Silk Date	Ear Height inch	Plant Height inch	Grain Protein %	Grain Starch %	Grain Oil %	Harvest Moisture %	Test Weight lb/bu	Grain Yield ¹	
											2009 -----bu/ac-----	2-yr Avg.
Kruger	86	K-1286RR	7/23	53.8	99.8	9.5	69.6	3.1	16.8	57.9	213.0	--
Kruger	88	K-6388VT3	7/22	50.5	92.5	8.4	69.6	3.0	16.4	58.8	197.8	--
Kruger	90	K-2090RR/YGCB	7/24	53.3	99.0	7.7	69.8	3.3	16.6	57.4	210.1	191.5
Kruger	90	K-6490VT3	7/25	55.0	100.8	8.1	69.7	3.6	16.6	56.9	224.5	--
Kruger	93	K-6093VT3	7/23	51.0	93.5	7.6	69.8	3.6	17.2	54.9	215.9	205.6
Kruger	95	K-6295VT3	7/25	55.3	102.8	8.0	69.6	3.7	18.4	54.8	229.2	--
Kruger	97	K-6097VT3	7/28	52.5	99.3	8.2	69.3	3.8	18.0	53.0	232.0	232.4
Kruger	98	K-6298VT3	7/24	52.3	98.5	8.5	69.0	3.8	19.6	54.1	224.3	213.0
Kruger	99	K-6499VT3	7/29	53.8	96.5	8.5	69.1	3.8	20.5	52.6	236.5	243.2
Kruger	100	K-6200VT3	7/24	55.3	100.3	7.9	69.5	3.7	17.8	55.6	230.4	--
Pioneer	92	38H08	7/23	59.8	95.8	7.6	70.0	3.0	16.6	53.7	213.3	207.4
Pioneer	94	38M58	7/23	58.8	99.0	7.3	70.4	3.4	16.9	56.7	225.2	--
Pioneer	99	37K11	7/28	55.3	101.0	8.4	68.1	4.4	19.3	51.6	227.2	--
Pioneer	99	36V53	7/27	58.5	104.3	8.2	69.0	4.1	20.5	52.0	239.3	--
Hyland Seeds	88	HL CVR48	7/25	56.8	103.5	8.1	69.2	3.8	17.1	57.4	222.2	--
Hyland Seeds	92	HL CVR54	7/28	55.3	101.3	8.0	69.0	4.6	17.4	54.2	242.8	225.8
Hyland Seeds	98	HL CVR68	7/25	54.5	100.3	8.3	70.0	3.5	18.7	55.3	229.4	--
Hyland Seeds	100	HL CVR74	7/31	55.3	97.8	8.7	68.4	4.2	20.9	51.6	220.9	--
Hyland Seeds	100	HL B49R	7/29	53.5	97.3	8.2	68.8	4.1	19.7	52.7	222.4	--
Proseed	93	793CBLLGT	7/24	54.0	97.3	8.3	70.1	3.3	19.9	53.8	209.6	211.9
Proseed	94	794CBLLGT	7/26	56.8	97.8	8.3	69.2	3.3	17.2	54.8	216.7	220.1
Proseed	94	894VT3	7/28	53.5	100.3	7.8	69.3	3.8	17.3	54.9	223.8	216.3
Proseed	96	896VT3	7/24	55.0	102.5	8.0	70.1	3.4	18.4	56.9	214.0	--
Dairyland Seed	89	ST-9789	7/24	51.8	99.8	8.3	69.9	3.7	17.6	55.7	221.6	--
Dairyland Seed	90	ST-7790	7/25	51.8	95.3	7.8	68.0	3.8	17.4	57.1	202.9	--
Dairyland Seed	92	ST-6992	7/25	52.8	96.3	8.0	69.3	3.8	17.2	55.9	230.0	--
Dairyland Seed	94	ST-9594	7/26	54.3	101.0	8.4	69.1	3.8	17.9	56.0	236.0	213.4
Dairyland Seed	95	ST-9395	7/29	55.8	100.0	7.8	68.9	4.0	17.3	54.4	234.4	--
Dairyland Seed	95	ST-9597Q	7/29	56.3	101.0	8.3	69.2	3.7	20.0	53.1	224.9	--
Mean				54.5	99.5	8.1	69.5	3.6	18.5	54.7	224.7	--
CV%				3.6	2.9	4.2	0.9	6.9	5.8	1.3	7.3	--
LSD.05				2.7	4.0	0.5	0.8	0.3	1.5	1.0	22.8	--

Corn Hybrid Performance Trial

Brand	R.M.	Hybrid	Silk Date	Ear Height inch	Plant Height inch	Grain Protein %	Grain Starch %	Grain Oil %	Harvest Moisture %	Test Weight lb/bu	Grain Yield ¹	
											2009	2-yr Avg. -----bu/ac-----
Renk	89	RK302CBLL	7/25	56.5	100.0	8.0	69.7	3.1	15.8	57.7	216.1	--
Renk	92	RK434RRYGCB	7/24	54.3	99.0	7.8	70.2	3.5	18.0	56.9	233.6	--
Renk	95	RK501VT3	7/26	55.3	99.0	8.1	69.2	3.8	18.9	54.6	230.6	--
Renk	96	RK570VT3	7/29	54.8	98.3	7.9	69.8	3.8	18.7	54.5	250.4	227.3
Seeds 2000	95	9501VT3	7/28	55.8	97.8	7.8	69.0	3.9	17.0	54.4	232.2	214.1
Seeds 2000	95	9502VT3	7/26	53.5	101.8	7.9	69.2	3.7	18.1	55.0	222.1	--
Seeds 2000	97	2973GT/CB	7/25	54.8	97.3	7.9	68.6	3.9	19.6	53.6	214.9	--
Seeds 2000	99	9901VT3	7/26	52.3	98.0	8.3	69.4	3.6	18.7	55.5	226.7	224.6
Gold Country	96	96-22VT3	7/23	54.5	96.5	7.6	70.6	3.2	16.4	56.1	219.1	--
Gold Country	98	98-10 VT3	7/29	52.8	96.0	8.5	68.6	3.9	20.4	52.4	233.3	235.8
Gold Country	100	101-01 VT3	7/26	51.5	99.5	8.2	69.6	3.6	19.4	54.8	230.5	--
PFS	95	68K95	7/27	55.5	98.5	8.4	69.4	3.2	17.3	55.0	209.5	--
PFS	97	53B97	7/25	53.3	99.5	8.1	69.8	3.5	18.9	56.2	215.1	218.9
Dyna-Gro Seed	92	D32SS29	7/27	53.5	100.8	7.6	69.9	3.6	18.6	54.7	228.7	--
Dyna-Gro Seed	96	54V78	7/28	54.8	101.0	7.8	69.1	3.8	17.0	54.1	228.1	--
Dyna-Gro Seed	97	54V29	7/25	54.5	98.0	8.1	70.0	3.3	17.8	56.5	200.3	--
G2 Genetics	97	5H-797 RR/HX	7/24	56.5	102.0	7.9	70.2	3.2	19.1	53.2	231.9	--
Tester	95		7/25	53.0	103.0	8.3	69.8	3.4	17.7	56.6	208.0	--
G2 Genetics	99	5H-999 RR/HX	7/26	55.0	100.3	8.2	69.9	3.1	19.8	54.8	241.2	--
G2 Genetics	99	5H-999A RR/HX	7/26	54.5	98.8	8.1	70.3	2.8	19.5	55.2	241.2	--
Tester	95		7/24	54.5	101.3	7.7	70.4	3.2	17.0	56.9	229.3	--
G2 Genetics	101	5H-501 RR/HX	7/25	55.5	103.5	7.9	69.5	3.5	20.1	53.5	239.5	--
G2 Genetics	101	5H-702 RR/HX	7/25	55.3	102.8	8.1	69.7	3.3	20.4	53.4	246.1	--
G2 Genetics	101	5X-802 RR/HXT	7/27	54.8	100.3	8.1	69.7	3.6	20.9	52.0	225.1	--
Mean				54.5	99.5	8.1	69.5	3.6	18.5	54.7	224.7	--
CV%				3.6	2.9	4.2	0.9	6.9	5.8	1.3	7.3	--
LSD.05				2.7	4.0	0.5	0.8	0.3	1.5	1.0	22.8	--

Corn Hybrid Performance Trial

Brand	R.M.	Hybrid	Silk Date	Ear Height inch	Plant Height inch	Grain Protein %	Grain Starch %	Grain Oil %	Harvest Moisture %	Test Weight lb/bu	Grain Yield ¹	
											2009 -----bu/ac-----	2-yr Avg.
NuTech Seed	98	3T-098 VT3	7/29	55.8	98.0	8.1	69.4	3.7	19.6	53.6	220.1	226.9
NuTech Seed	98	5B-198 GT	7/26	55.0	100.5	8.3	68.6	3.9	19.7	53.2	230.4	--
NuTech Seed	98	5N-398	7/27	57.0	99.8	7.9	69.3	4.0	20.1	52.6	228.2	--
NuTech Seed	100	5X-100 RR/HXT	7/30	63.3	107.8	8.1	69.1	4.2	20.4	52.3	233.3	--
NuTech Seed	100	3T-300 VT3	7/27	56.3	104.0	8.2	69.2	3.9	19.2	53.2	235.5	--
NuTech Seed	100	3T-600 VT3	7/26	56.8	104.8	8.7	69.6	3.5	18.8	53.8	224.1	--
NuTech Seed	101	1N-001	7/28	56.3	100.5	8.1	69.3	3.9	20.4	50.8	227.5	--
NuTech Seed	101	3T-801 VT3	7/30	54.3	103.0	7.4	69.1	3.9	20.8	51.2	207.1	--
Dekalb	98	DKC48-37	7/23	52.0	98.0	7.9	69.8	3.5	17.5	56.0	217.8	--
Dekalb	100	DKC50-35	7/25	51.0	98.8	8.4	69.3	3.6	19.2	53.1	234.0	--
Dekalb	100	DKC50-44	7/26	55.8	99.0	7.9	69.9	3.5	19.8	54.4	236.1	234.1
Wensman	93	W 7143VT3	7/26	54.0	99.8	7.8	70.1	3.4	17.3	56.6	210.4	219.5
Wensman	95	W 8180VT3	7/24	51.3	99.3	7.8	69.8	3.5	18.1	56.4	234.9	--
Wensman	97	W 7267VT3	7/29	55.3	98.0	8.6	68.8	3.8	20.0	53.0	224.9	237.2
Wensman	97	W 7270VT3	7/25	50.8	98.8	8.4	69.6	3.6	18.7	54.5	207.8	--
Wensman	98	W 7273VT3	7/29	50.5	93.5	8.7	69.1	3.9	19.0	53.7	226.2	223.4
Wensman	99	W 7289VT3	7/26	54.5	101.0	8.2	69.8	3.6	18.2	55.4	231.7	220.1
Integra Fortified Seed	95	9453VT3	7/26	55.8	101.5	7.8	69.4	3.9	17.6	54.4	217.0	--
Integra Fortified Seed	97	9472VT3	7/26	53.8	98.5	8.5	68.6	4.1	19.7	54.3	215.9	--
Integra Fortified Seed	98	9480VT3	7/26	52.0	97.5	8.1	69.6	3.4	18.7	55.0	218.6	212.2
Terning	93	8235	7/25	52.5	96.5	8.3	69.6	3.4	19.0	54.0	211.6	--
REA	95	4T297	7/25	52.8	99.3	7.7	69.5	3.6	18.0	54.8	216.1	--
REA	98	4T918	7/25	53.0	100.5	8.0	69.9	3.5	20.1	54.2	228.0	--
Crow's	95	1725	7/25	55.5	103.3	7.9	70.0	3.4	18.2	56.4	221.9	--
Crow's	92	1685	7/23	52.8	93.5	8.0	69.4	3.8	18.1	55.5	241.4	--
Mean				54.5	99.5	8.1	69.5	3.6	18.5	54.7	224.7	--
CV%				3.6	2.9	4.2	0.9	6.9	5.8	1.3	7.3	--
LSD.05				2.7	4.0	0.5	0.8	0.3	1.5	1.0	22.8	--

¹Moisture adjusted to 15.5%

**Planting Date = April 28; Harvest Date = November 19; Previous Crop = Soybean.
Fertilizer Rate lb/acre = 200 N, 43 P₂O₅, 52 K₂O, 22 S; Irrigation = 10.75"**

Onion Hybrid Performance Trial

Hybrid	Seed Source	Maturity Days	Days to Down ¹	Days to				Total	Culls	Single Center ²	Total Bulbs /acre
				> 4"	3 to 4"	2¼ to 3"	1 to 2¼"				
				-----cwt-----						%	
Centerstone	AT	100	9/6	87	691	220	24	1022	19	50	177486
Frontier	AT	98	8/24	0	135	308	69	513	8	45	164964
Milestone	AT	107	9/1	21	453	308	36	818	11	53	174115
T-433	AT		9/25	80	312	65	5	463	111	35	91031
Calibra	BE	115	9/8	93	531	153	29	806	148	30	164723
Crockett	BE	118	9/19	72	646	176	23	916	153	38	180617
Delgado	BE	115	9/2	204	641	124	18	987	139	40	164482
Derby	BE	106	8/29	33	260	222	52	566	184	23	167372
Gunnison	BE	110	8/29	78	578	196	26	878	24	43	167853
Red Bull	BE	117	9/10	64	443	156	30	693	31	38	134379
Safrane	BE	106	9/9	82	534	140	25	781	31	48	142808
Sedona	BE	120	9/5	151	761	191	24	1127	21	50	185434
Talon	BE	110	9/1	37	551	235	38	862	15	30	174838
Tamara	BE	112	9/2	11	410	261	56	739	23	23	169058
Genesis	CR	100	8/20	16	261	239	73	589	22	20	166649
Nobility	CR	108	9/4	11	292	201	50	554	19	43	136546
OLYX01-214	CR		8/23	16	322	260	68	667	23	50	170262
OLYX05-26	CR		9/3	114	493	198	47	852	16	43	164723
Infinity	NU	120	8/31	79	595	220	48	942	16	38	183989
Nebula	NU	100	8/26	38	547	232	35	852	10	33	173633
Pulsar	NU	118	8/18	46	588	256	31	920	11	45	180136
Abilene	SM	113	9/2	77	393	267	58	795	26	48	181099
Caveat	SM	115	8/28	48	472	220	50	791	30	30	169539
Citation	SM		8/30	66	403	205	36	710	31	35	144975
Cyprus	SM		9/1	9	242	325	81	658	15	48	179413
Joliet	SM		9/2	82	422	219	37	760	61	45	160388
Marquette	SM		9/1	75	451	243	47	817	27	48	177486
Red Zepplin	SM	115	9/6	22	401	245	49	716	62	38	168817
Ricochet	SM	100	8/17	53	346	212	41	652	10	55	140159
Tioga	SM	115	9/2	130	566	146	26	869	114	40	158221
Stanley	SO		9/4	20	461	236	42	758	51	40	166649
Livingston	SO		9/4	37	390	271	53	752	36	43	170021
Marco	SO		8/16	11	341	272	47	671	32	35	177727
Polo	SO		9/6	42	450	179	26	697	59	25	150033
Mean				59	453	218	41	770	47	39.6	164106
CV%				69	17	19	34	12	66	57	11
LSD.05				57	111	57	20	127	43	3.2	26042

¹Days from planting to when half the onion tops have fallen over. This is an indication of maturity.

²Percent of onions with single centers from ten large onions selected at random.

Planting Date = May 4; Harvest Date = September 26; Previous Crop Barley.

Fertilizer rate lb/acre = 150 N, 43 P₂O₅, 52 K₂O, 22 S; Irrigation = 14"

Soybean Variety Trial

Variety	Mature Date	Plant Ht inch	Plant ¹ Lodge 0-9	Seeds/ pound	Seed Oil %	Seed Protein %	Test Weight lb/bu	Seed Yield ²		
								2009 -----bu/ac-----	2-yr Avg.	
Pioneer	90Y80	9/18	38.8	0.8	2349	18.6	35.1	55.5	64.9	--
Pioneer	91Y20	9/22	36.3	0.0	2360	17.7	36.2	55.9	63.2	60.4
Pioneer	91M51	9/23	36.8	0.1	2627	18.7	35.0	55.6	58.0	56.5
Pioneer	91Y70	9/26	39.5	0.6	2453	19.1	34.7	55.7	58.9	--
Mustang Seed	M-089RR	9/24	37.3	0.8	2789	17.7	34.1	56.5	64.3	59.5
Mustang Seed	M-096RR	9/23	37.0	0.6	2545	17.9	35.2	55.3	63.2	62.6
Hyland Seeds	RR Richwood	9/24	40.0	0.9	2235	17.7	35.4	55.9	60.8	57.3
Kruger Seeds	K-042RR	9/17	39.0	0.9	2465	18.2	35.6	55.5	59.1	56.0
Kruger Seeds	K2X05A9	9/18	38.3	0.4	2428	17.7	36.1	55.5	60.2	--
Kruger Seeds	K-058RR	9/13	32.8	1.4	2948	17.2	37.2	55.8	57.6	54.6
Kruger Seeds	K2X06A9	9/17	34.5	0.4	1943	17.2	36.8	55.5	62.2	--
Kruger Seeds	K-072+RR	9/20	34.3	0.5	2845	17.6	36.3	54.8	59.8	62.6
Kruger Seeds	K-091RR	9/21	36.8	0.1	2459	17.3	36.5	57.7	59.8	59.9
Kruger Seeds	K2X09A9	9/24	39.3	0.3	2194	17.8	36.5	55.7	63.0	--
Kruger Seeds	K2X10A9	9/21	34.3	0.6	2093	17.5	37.1	55.7	67.8	--
Kruger Seeds	K2X11B9	9/23	39.0	2.5	2708	17.6	36.2	55.3	65.7	--
Kruger Seeds	K2X11A9	9/23	38.8	0.5	2208	17.5	36.6	55.9	62.6	--
Kruger Seeds	K2X12A9	9/17	37.8	0.5	2459	18.3	35.3	55.7	54.2	--
Kruger Seeds	K-129RR	9/22	37.5	0.3	2242	17.7	36.4	55.7	56.9	58.7
Proseed	80-90	9/22	38.3	1.8	2278	17.8	36.6	55.5	62.7	60.8
Proseed	90-Y90	9/20	33.8	0.8	2207	17.5	36.9	55.9	64.9	--
Proseed	91-Y10	9/24	40.5	0.4	2275	17.7	36.4	55.7	62.1	--
Dairyland	DSR-0747/R2Y	9/23	36.3	0.9	2428	17.3	36.4	55.9	64.6	--
Dairyland	DSR-1100/RR	9/29	38.3	0.6	2241	17.9	36.2	55.7	62.0	--
Dairyland	DST11-001/R2Y	9/23	37.8	1.1	2325	17.7	35.6	55.7	64.0	--
Dairyland	DSR-1200/R2Y	9/20	37.3	0.6	2479	17.7	35.9	55.1	65.6	--
PFS	11R10	9/21	33.5	0.8	2243	17.4	37.1	55.7	67.3	--
PFS	1013RR	9/22	36.0	0.4	2032	17.9	36.3	55.8	57.4	--
Dyna-Gro Seed	39D11	9/24	40.5	2.1	3412	17.6	34.8	56.5	49.4	--
Dyna-Gro Seed	36B14	9/23	37.5	0.3	2597	18.7	34.7	55.8	60.6	--
Dyna-Gro Seed	Exp14R2Y	9/24	38.8	0.5	2336	18.2	35.6	55.8	63.9	--
Gold Country Seed	2806RR	9/20	37.0	1.3	2632	17.9	34.4	56.4	62.4	60.1
Gold Country Seed	2509RR	9/22	37.5	1.1	2258	17.8	36.1	56.5	62.9	62.2
NK Brand	S06-W2	9/19	40.3	1.1	2387	16.7	37.4	55.8	65.0	63.7
NK Brand	S08-A2	9/14	35.3	0.0	2363	18.4	34.9	56.4	59.3	--
NK Brand	S09-N6	9/21	36.5	0.5	2321	17.7	36.0	55.6	65.7	--
Mean			36.9	0.7	2462	17.7	36.0	55.8	61.6	
CV%			3.4	57.7	6	0.8	0.7	0.6	6.6	
LSD.05			1.7	0.6	212	0.2	0.4	0.5	5.7	

Soybean Variety Trial

Variety	Mature Date	Plant Ht inch	Plant ¹ Lodge 0-9	Seeds/ pound	Seed Oil %	Seed Protein %	Test Weight lb/bu	Seed Yield ²		
								2009 -----bu/ac-----	2-yr Avg.	
Thunder	2905RR	9/12	31.8	1.0	2743	17.2	37.1	55.7	60.4	--
Thunder	2906RR	9/19	38.0	1.6	2478	17.9	34.4	56.3	62.9	--
Fill		9/17	35.0	1.1	2287	17.8	36.6	55.4	60.9	--
Thunder	Exp3010RR	9/23	39.8	0.5	2253	17.6	36.4	55.9	60.2	--
Thunder	2810	9/21	32.0	0.1	2917	17.7	35.3	55.7	59.3	--
G2 (Nutech)	6098	9/19	39.3	0.1	2234	17.5	35.7	55.8	66.7	--
NuTech	NT-0889	9/20	38.5	1.4	2345	17.8	36.3	56.5	63.3	--
NuTech	6122	9/22	37.5	0.6	2894	17.0	35.7	57.8	60.6	--
G2 (Nutech)	6088	9/20	34.0	0.4	2746	17.5	36.3	55.1	61.8	--
NuTech	0886RR	9/19	35.0	0.5	2864	17.7	36.3	54.9	60.1	62.8
NuTech	0990RR	9/20	35.8	0.6	2558	17.3	36.4	57.9	58.9	--
Wensman	W 2090RR	9/22	38.5	1.3	2360	17.8	36.0	56.7	62.2	62.9
Wensman	W 3101R2	9/24	34.3	0.5	2238	17.5	37.0	55.6	63.4	--
Wensman	W 2108RR	9/21	37.3	0.4	2421	17.4	36.4	57.8	60.2	61.7
Wensman	W 2112RR	9/15	35.8	0.5	2363	17.7	36.2	55.5	59.6	--
Integra Fortified	78070R	9/20	35.0	0.5	2841	17.5	36.3	55.0	62.0	--
Integra Fortified	2110RR2	9/23	39.3	0.4	2172	17.7	36.2	55.4	59.0	--
Asgrow	AG0808	9/24	38.8	1.5	2267	18.1	34.3	55.6	62.5	--
Asgrow	AG1102	9/24	38.5	1.1	2802	17.6	34.9	56.7	68.5	63.0
Asgrow	RY0809	9/15	36.8	0.6	2446	17.2	36.2	55.4	63.1	--
Asgrow	RY0819	9/19	37.5	0.9	2356	17.9	35.6	55.4	65.6	--
REA	6791RR	9/22	38.3	1.0	2280	17.8	36.2	56.5	58.3	59.6
REA	Exp-1050	9/22	33.0	0.5	2177	17.5	36.9	55.8	64.2	--
REA	Exp-1051	9/24	39.8	0.5	2378	17.6	36.3	55.5	56.4	--
Northstar Genetics	NS1012RR	9/21	35.0	0.8	2756	17.6	36.2	55.2	60.1	--
Northstar Genetics	NS0853RR	9/20	35.3	0.6	2897	17.7	36.3	55.2	60.2	60.9
Northstar Genetics	NS0514RR	9/12	29.8	1.1	2893	17.2	37.0	55.4	59.4	--
Mean			36.9	0.7	2462	17.7	36.0	55.8	61.6	
CV%			3.4	57.7	6	0.8	0.7	0.6	6.6	
LSD.05			1.7	0.6	212	0.2	0.4	0.5	5.7	

¹Lodging is from 1 to 9; 0 is erect, 9 is flat.

²Yield is adjusted to 13% moisture.

Planting Date = May 15; Harvest Date = October 13; Previous Crop = Corn.

Fertilize Rate lb/acre = 30 N, 43 P₂O₅, 52 K₂O, 22 S; Irrigation = 9.3"

Corn Row Width Hybrid Study

	Grain ¹	Harvest	Test	Population	Ears/Plant	Ear Height	Plant Height	Grain			Silk Date	Mature Date
	Yield	Moisture	Weight					Oil	Protein	Starch		
	bu/ac	%	lb/bu					plants/ac	-----inches-----	-----%-----		
Row Width												
15	204.8	20.7	48.9	40665	1.01	52	92	2.74	6.50	73.37	7/29	10/17
30	209.0	21.1	48.3	39786	1.02	50	92	2.77	6.45	73.49	7/29	10/17
Mean	206.9	20.9	48.6	40225	1.02	51	92	2.76	6.48	73.43		
CV%	4.9	4.5	1.2	3	0.87	4	3	8.67	8.88	0.74		
LSD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		

Hybrid												
1807	207.9	22.1	47.8	42803	1.02	53	92	2.92	6.68	72.98	8/2	10/19
P9494XR	203.9	20.5	47.0	38229	1.03	53	94	2.76	6.31	73.26	7/29	10/16
DKC43-31	208.8	20.2	50.9	39645	1.00	47	90	2.59	6.44	74.05	7/25	10/16
CV%	2.9	3.8	1.3	6	2.69	2	3	7.48	4.23	0.74		
LSD	0.8	NS	0.8	3151	NS	1	3	NS	NS	0.67		

Row by Hybrid													
15	1807	208.7	21.8	48.1	43569	1.01	54	93	2.91	6.80	72.95	8/2	10/20
30	1807	207.1	22.3	47.6	42037	1.02	51	92	2.93	6.56	73.01	8/2	10/19
15	P9494XR	203.0	20.4	47.4	38777	1.03	54	94	2.70	6.24	73.18	7/29	10/16
30	P9494XR	204.9	20.6	46.6	37681	1.04	53	94	2.83	6.39	73.34	7/29	10/17
15	DKC43-31	202.8	19.8	51.1	39648	1.00	49	89	2.62	6.47	73.99	7/25	10/16
30	DKC43-31	214.9	20.5	50.7	39641	1.01	46	90	2.56	6.40	74.12	7/25	10/16
LSD		NS	4.2	NS	NS	NS	NS	NS	NS	NS	NS		

¹Yield adjusted to 15.5% moisture.

Planting Date = May 14; Harvest Date = November 19; Previous Crop = Dry Edible Bean.

Fertilizer Rate lb/acre = 180 N, 43 P₂O₅, 52 K₂O, 22 S; Irrigation = 10.4"

Strip-Till, Corn on Corn Nitrogen Rate Study

Fertilizer N Rate	Grain Yield ¹ bu/ac	Harvest Moisture %	Test Weight lb/bu	Soil Nitrate-N		Chlorophyll meter reading		Stalk Nitrate-N ---ppm---	Grain			Silk Date
				Fall 2009	Fall 2008	16-Jul	3-Aug		Oil -----%-----	Protein	Starch	
20	65.9	21.9	47.7	12	9	23.6	23.4	67	3.67	6.19	73.73	7/31
50	81.1	23.3	46.7	18	8	25.7	27.1	91	3.80	6.15	73.17	7/31
100	127.5	23.7	46.3	18	8	35.6	37.7	67	3.50	6.05	73.73	7/30
150	171.7	22.8	48.4	15	9	38.7	47.3	1120	3.21	6.67	73.65	7/29
200	202.1	20.9	50.1	27	11	41.6	51.5	285	3.01	7.20	73.52	7/27
Mean	129.7	22.5	47.8	18	9	33.0	37.4	326	3.44	6.45	73.56	
CV%	4.4	6.0	1.3	28	19	6.4	4.7	307	5.62	2.32	0.51	
LSD.05	8.8	2.1	1.0	8	NS	3.3	2.7	1559	0.30	0.23	0.58	

¹Yield adjusted to 15.5%

Planting Date = May 8; Harvest Date = November 18; Previous Crop = Corn.

Fertilizer Rate lb/acre = See table for N, 40 P₂O₅, 17 S; Irrigation = 6.75"

Strip-Till, Corn on Soybean Nitrogen Rate Study

Fertilizer N Rate lb/ac	Grain Yield ¹ bu/ac	Harvest Moisture %	Test Weight lb/bu	Soil Nitrate-N		Chlorophyll		Stalk Nitrate-N ---ppm---	Grain			Silk Date
				Fall 2009 -----lb/ac-----	Fall ² 2008	Meter Reading			Oil	Protein	Starch	
						3-Aug	17-Aug		-----%			
20	77.8	30.8	46.7	13	9	28.0	27.7	41	3.97	6.36	73.59	8/1
50	83.4	31.4	46.1	9	9	29.1	29.2	46	4.05	6.55	73.03	8/1
100	137.7	30.7	45.0	9	9	39.9	39.6	59	3.71	6.38	72.75	7/30
150	179.2	32.1	45.8	12	9	47.1	48.4	48	3.53	6.58	72.28	7/30
200	204.1	31.5	47.2	9	9	51.5	55.2	112	3.45	7.29	72.33	7/29
Mean	136.4	31.3	46.1	10		39.1	40.0	61	3.74	6.63	72.79	
CV%	7.6	4.1	2.5	33		5.8	5.4	70	6.08	3.59	0.67	
LSD.05	15.9	NS	NS	NS		3.5	3.3	68	0.35	0.37	0.75	

¹Yield adjusted to 15.5%

²Composite sample from the entire soybean plot.

Planting Date = April 12; Harvest Date = ; Previous Crop = Soybean.

Fertilizer Rate lb/acre = See table for N, 40 P₂O₅, 17 S; Irrigation = 10.3"

Onion - Strip-Till vs Conventional

Tillage Treatment	Days to Half Down ¹	Onion Yield by Bulb Size					Culls	Total	Single Center ²	Total Bulbs
		>4"	3 to 4"	2 ¼ to 3"	1 to 2 ¼"					
							-----cwt/ac-----		%	1000/ac
Conventional Tillage	9/16	176	573	105	13	34	867	80	128	
Strip-Tillage	9/7	76	661	234	31	12	1002	78	182	
MEAN	11	126	617	169	22	23	934	79	155	
C.V.%	19	39	4	21	18	45	3	19	7	
LSD.05	5	NS	55	80	9	NS	58	NS	26	

¹Days from planting to when half the onion tops have fallen over. This is an indication of maturity.

²Percent of onions with single centers from ten large onions selected at random.

Planting Date = May 4; Harvest Date = September 21; Previous Crop = HRSW.

Fertilizer Rate lb/acre: N = 150, P₂O₅ = 43, K₂O = 52 and Sulfur = 22.

Irrigation = 14" Hybrid = Sedona.

Optimal Corn stalk Removal for Biofuel and the Environment

Stalk Removal %	Grain ¹ Yield bu/ac	Harvest Moisture %	Test Weight lb/bu	Stalk Removal ton/ac	Stalk ² Addition ton/ac	Soil Nitrate-N Fall 2009 lb/ac	Chlorophyll Meter Reading		Population plant/ac
							8/3	8/20	
0	199.5	33.5	50.8	0.0	8.0	17	52.7	53.5	38986
33	205.8	31.9	52.0	2.8	5.0	17	53.0	55.0	39966
67	206.2	32.1	51.3	4.0	3.0	14	53.8	55.2	39313
100	209.4	29.2	53.3	6.3	0.0	16	53.3	55.0	40075
Mean	205.2	31.7	51.8	3.3	4.0	16	53.2	54.7	39585
CV%	3.7	3.2	0.9	10.3	0.0	18	2.9	1.2	4
LSD.05	NS	1.6	0.7	0.5	NS	NS	NS	1.018	NS

Stalk Removal %	Stalk Nitrate-N ppm	Ear/Plant	Silk Date	Mature Date
0	424	0.99	7/29	10/19
33	331	1.00	7/29	10/18
67	353	1.00	7/27	10/16
100	477	0.98	7/26	10/17
Mean	396	0.99	7/28	10/17
CV%	68	2.67		
LSD.05	NS	NS		

¹Yield adjusted to 15.5% moisture.

²Amount of corn stover added in spring 2008 as all stover was removed in fall of 2008.

Plots were strip-tilled using an Orthman 1tRIPrAR strip-till machine.

Planting Date = May 12; Harvest Date = October 19; Previous Crop = Corn.

Fertilizer Rate lb/acre = 200 N, 40 P₂O₅, 17 S; Irrigation = 9.5"

Sugarbeet Hybrid Tillage Study

Tillage	Yield ton/ac	Sugar -----%-----	Sugar Loss	Sugar Recoverable		sodium	potassium	amino N
				sugar lb/ton	sugar lb/ac			
Conventional	41.3	16.0	1.2	296	12263	92	1885	379
Strip-Till	37.4	15.9	1.2	295	11054	110	1913	346
MEAN	39.4	16.0	1.2	296	11658	101	1899	362
C.V.%	5.3	2.6	15.5	3	4	21	10	26
LSD.05	2.7	NS	NS	NS	625	NS	NS	NS

Hybrid								
Crystal R343	38.5	16.1	1.3	295	11369	117	2069	434
1305R	40.3	16.1	1.1	300	12112	96	1813	355
SU46519	39.2	15.7	1.0	293	11495	90	1815	299
MEAN	39.4	16.0	1.2	296	11658	101	1899	362
C.V.%	5.8	3.0	8.3	3	6	21	5	14
LSD.05	NS	NS	0.1	NS	NS	NS	126	64

Tillage x Hybrid								
Conventional, Crystal	41.8	16.2	1.3	297	12378	103	2080	453
Strip-Till, Crystal R434	35.3	16.0	1.3	293	10360	131	2059	414
Conventional, 1305R	42.5	16.2	1.1	302	12833	88	1818	369
Strip-Till, 1305R	38.2	16.0	1.1	298	11391	104	1809	341
Conventional, SU46519	39.7	15.6	1.0	291	11580	85	1758	315
Strip-Till, SU46519	38.8	15.8	1.0	295	11411	96	1872	282
MEAN	39.4	16.0	1.2	296	11658	101	1899	362
C.V.%	12.2	2.4	7.3	3	14	28	6	10
LSD.05	NS	NS	NS	NS	NS	NS	NS	NS

**Planting Date = May 6; Harvest Date = October 26; Previous Crop = Barley.
Fertilizer Rate lb/acre = 150 N, 43 P₂O₅, 52 K₂O, 22 S; Irrigation = 13.25"**