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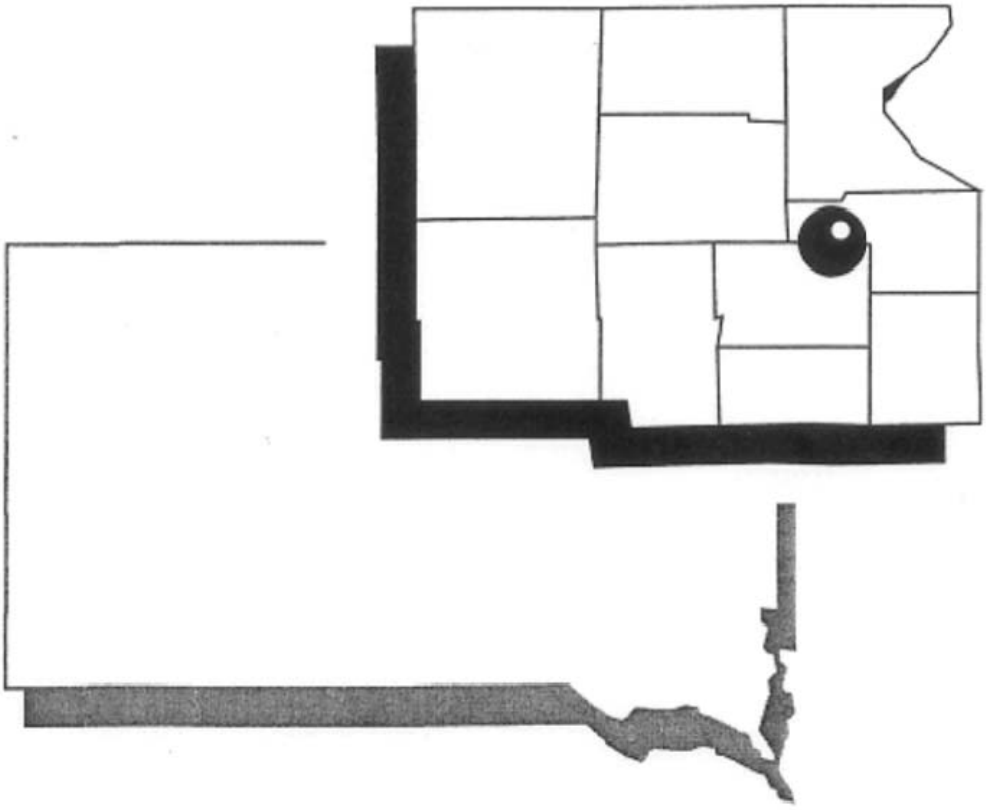
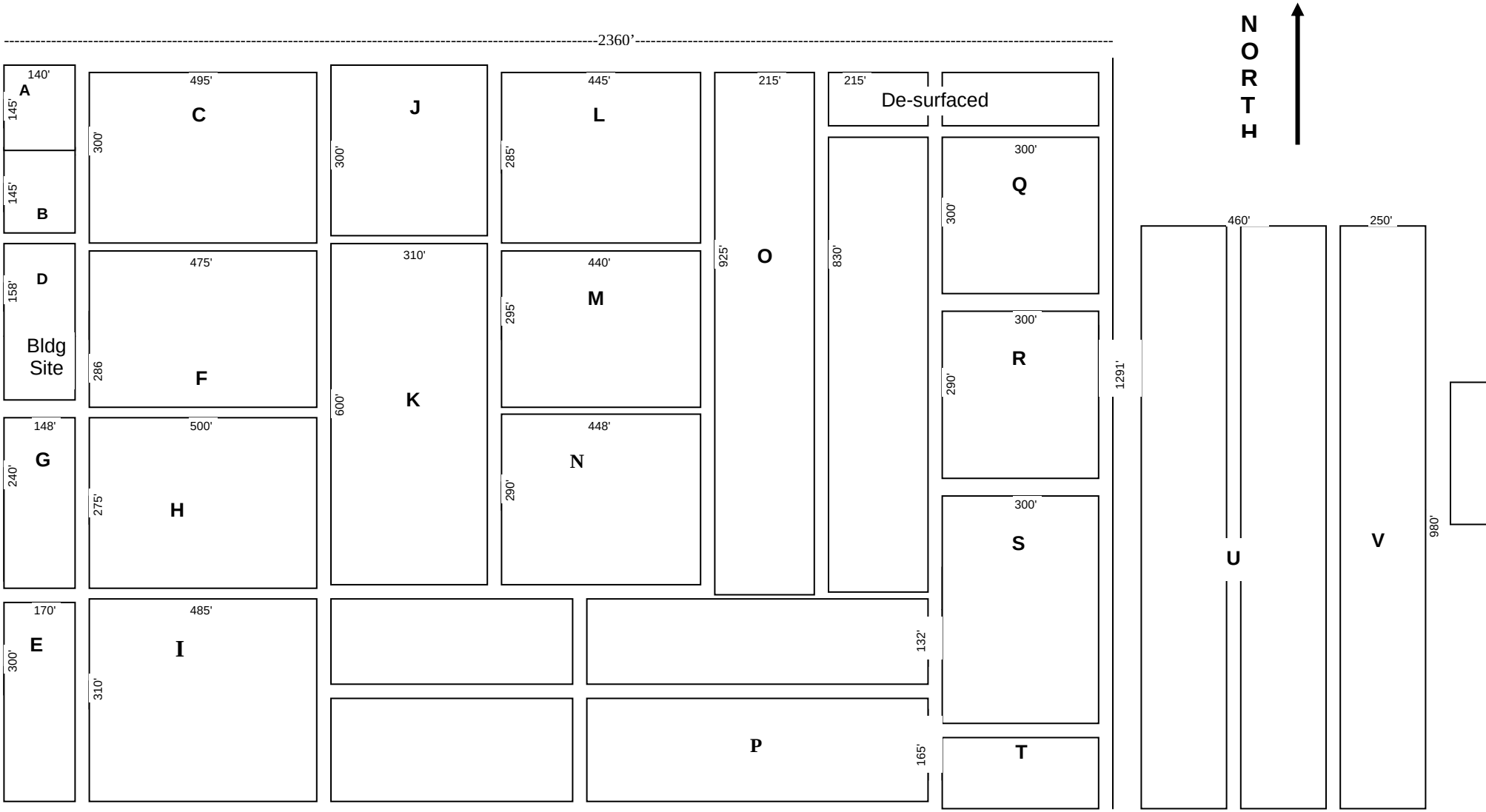


Northeast Research Station

Watertown, South Dakota

Plant Science Department • South Dakota State University • Brookings SD 57007

Northeast Research Station (Watertown)
2006 Land Use Map



Plot Acreage:

A	0.49	H	3.15	O	9.57	V	5.5
B	0.49	I	3.44	P	8.65		
C	3.40	J	2.13	Q	2.06		
D	0.54	K	4.27	R	2.00		
E	1.20	L	3.00	S	3.00		
F	3.12	M	3.00	T	0.51		
G	0.86	N	2.98	U	9.72		

Roadways: 25 feet wide
Acreage in farm: 86
Experimental Acreage: 74

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2006
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Annual Progress Report, 2006
Northeast Research Station
J. D. Smolik

The 2006 growing season was three weeks longer than average and growing season precipitation was more than 4 inches below average (Table 1). Precipitation was well below average for all months except April and September, and hot, dry conditions prevailed through much of July and August. The September rainfall arrived too late to benefit this year's crops, but aided in the establishment of winter wheat. Growing season precipitation over the past 51 years is summarized in Figure 1.

Crops were planted in a timely manner and established well. Small grain crops generally completed development prior to the onset of the hot, dry conditions. Oat yields were 3% less than the previous year, spring wheat yields were 14% lower, and barley yields were 16% below the previous year. Alfalfa yields were 22% lower than 2005 and flax yields were down 27%. Row crops yields were severely reduced by the drought conditions. Soybean yields were 42% lower and corn yields were 58% lower than the previous year. The dry conditions inhibited the development of most plant diseases. Insect problems were generally minor, although some corn borer activity was noted.

The summer tour included herbicide studies, small grain varieties and diseases, field pea trials, corn and soybean insects, and soil fertility studies. The fall tour emphasized row crops and included effects of moisture stress on corn and soybean yields, soybean breeding, herbicide studies, soybean insects, and a discussion on forage and biomass crops. We thank the Area Crop Improvement Associations for sponsoring the lunch at the summer tour. Thanks also to Orrin Korth and family for their assistance with harvest operations. We also thank members of the Northeast Station Advisory Board for their consistent support.

Note: Much of the information in this report is based on ongoing studies and results should therefore be considered tentative. The use of trade names in this publication is not an endorsement of the product by either the Plant Science Department or the Agricultural Experiment Station.

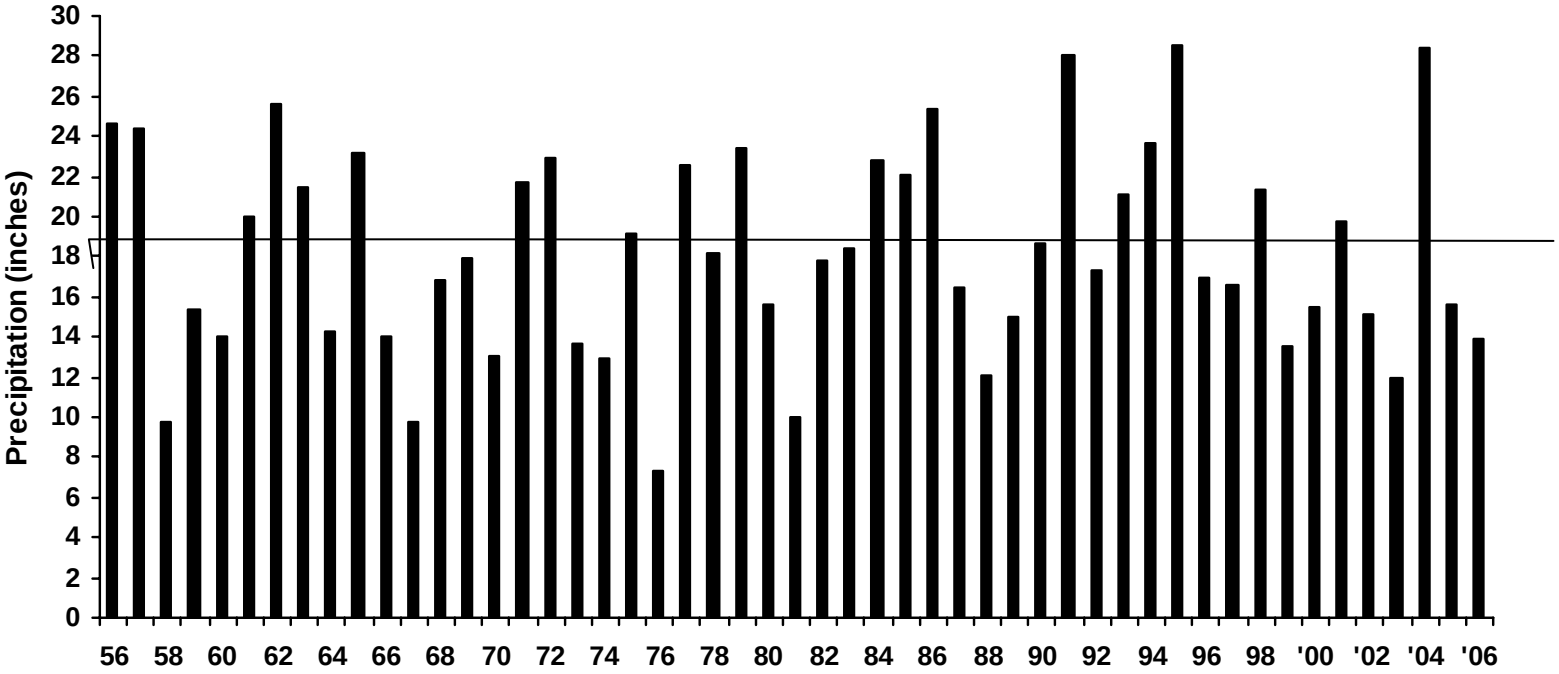
Special thanks to Lucinda Olson for her assistance in preparing this report.

Table 1. Growing Season Precipitation* (inches) 1956 - 2006

Year	April	May	June	July	Aug.	Sept.	Oct.	Total	Frost-Free Days
1956	1.80	2.88	6.56	4.02	6.25	0.70	2.44	24.65	125
1957	4.26	5.98	2.85	0.74	5.26	2.12	3.12	24.33	119
1958	1.41	1.49	2.65	2.68	0.57	0.81	0.18	9.79	116
1959	0.58	3.47	1.91	1.66	4.69	1.10	1.95	15.36	110
1960	1.53	3.84	4.05	0.79	1.03	1.30	1.50	14.04	123
1961	2.16	5.75	4.01	4.62	0.62	1.84	1.00	20.00	138
1962	1.39	5.48	3.98	10.36	1.89	1.39	1.11	25.60	143
1963	1.41	3.54	3.22	5.74	2.51	4.33	0.68	21.43	158
1964	2.39	1.07	3.62	2.01	4.22	0.93	0.04	14.28	92
1965	2.89	6.08	3.66	2.34	2.63	4.33	1.23	23.16	104
1966	1.49	0.77	1.88	2.19	4.59	1.53	1.52	13.97	138
1967	0.92	0.69	4.58	1.05	1.13	1.06	0.35	9.78	129
1968	3.04	2.15	3.18	2.39	1.53	2.56	2.00	16.85	132
1969	1.52	3.44	1.96	4.52	2.48	1.86	2.18	17.96	109
1970	2.00	1.98	1.07	2.29	1.00	1.66	2.01	13.01	148
1971	1.33	1.78	7.61	1.02	2.93	1.46	5.56	21.69	168
1972	1.90	7.73	2.92	6.35	2.57	0.11	1.37	22.95	172
1973	1.14	2.87	1.12	2.05	1.27	3.81	1.39	13.65	183
1974	1.22	3.37	1.45	2.09	3.70	0.22	0.91	12.96	141
1975	4.15	2.18	4.76	1.25	2.89	2.28	1.64	19.15	139
1976	1.10	1.26	1.49	0.51	0.79	1.62	0.57	7.34	144
1977	2.64	2.24	5.78	2.47	2.70	3.67	3.06	22.56	180
1978	3.38	5.15	2.26	2.08	2.43	2.32	0.53	18.15	178
1979	3.14	2.17	5.78	3.10	5.21	0.53	3.50	23.43	162
1980	0.43	3.09	4.97	1.96	3.82	0.72	0.68	15.67	150
1981	0.48	0.99	2.73	2.23	1.20	0.52	1.88	10.03	136
1982	0.35	5.50	1.37	4.05	0.64	2.73	3.11	17.75	175
1983	0.70	1.64	3.43	5.45	3.00	2.86	1.30	18.38	140
1984	2.88	1.66	7.45	1.85	3.09	1.14	4.69	22.76	147
1985	1.93	3.90	2.07	5.21	3.65	3.77	1.59	22.12	167
1986	5.55	4.64	3.62	4.14	3.11	4.19	0.13	25.38	159
1987	0.55	2.03	1.20	4.16	5.64	2.44	0.45	16.47	162
1988	0.59	2.76	0.69	0.86	4.03	2.98	0.22	12.13	144
1989	2.95	1.15	1.74	2.41	4.58	1.56	0.56	14.95	147
1990	1.04	2.26	5.13	3.73	2.58	2.16	1.78	18.68	136
1991	4.01	4.41	10.45	2.69	4.37	1.45	0.63	28.01	146
1992	0.91	1.45	7.95	3.08	0.75	3.17	0.02	17.33	154
1993	1.69	2.53	6.58	6.70	1.40	2.05	0.17	21.12	149
1994	2.48	2.12	6.11	4.65	3.67	2.47	2.11	23.61	162
1995	2.92	3.66	2.89	8.05	6.09	2.45	2.43	28.49	152
1996	0.18	4.20	1.36	3.43	2.92	2.34	2.57	17.00	154
1997	2.20	0.97	0.76	4.77	4.23	1.39	2.25	16.57	152
1998	0.69	4.18	2.96	1.93	3.94	0.02	7.58	21.30	167
1999	1.45	2.57	4.96	1.56	0.49	2.29	0.25	13.57	165
2000	1.20	2.35	3.29	4.29	0.88	1.00	2.45	15.46	157
2001	6.96	2.75	3.94	2.85	0.18	2.35	0.67	19.70	165
2002	1.75	1.67	2.57	2.48	4.44	0.75	1.45	15.11	135
2003	1.78	3.26	1.18	1.94	1.40	1.75	0.67	11.98	160
2004	1.83	5.70	3.34	5.88	1.20	4.77	5.64	28.36	153
2005	1.10	3.43	4.39	1.18	1.67	2.41	1.37	15.55	157
2006	2.53	1.99	0.95	0.92	1.93	5.36	0.24	13.92	168
Avg:	1.96	3.03	3.57	3.15	2.73	2.05	1.71	18.20	147

*1960-1962, 1973-1976, 1978 and 1979 data obtained from Watertown FAA station.

Figure 1. Growing Season Precipitation, 1956 - 2006



Spring-Seeded Small Grains - 2006 Eastern South Dakota Variety Test Results

Robert G. Hall, Extension agronomist – crops
Kevin K. Kirby, Agricultural research mgr.

Trial Methods

A random complete block design is used in all trials. Plots measured 5 feet wide and either 12 or 14 feet long. Plots were fertilized with 60 lb. per acre of 18-46-0 (10.8 pounds of N and 27.6 pounds of phosphorous per acre) down the seed tube at seeding. In addition, a post-emergence application of Bronate (1.0 pint) was applied on the spring wheat, oats, and barley plots. Small grain plots were seeded at 28 pure live seeds per square foot to obtain a density of about 25 seedlings per square foot. Yield means were generated from four variety replications per location and adjusted to 13% moisture. Plots were harvested with an 8XP Massey Ferguson small plot combine.

Performance Trial Results

HRS Wheat (Tables 1a-b) - The top entries for yield for the past 3-years (2004-06) by variety or experimental line and top yield frequency were **SD 3868 at 100%; Briggs, Grander, and Traverse at 86%; Steele-ND at 71%; Freyr and SD 3860 at 57%;** and **Forge, Knudson, Oxen, and Reeder at 43%** (tables 1a.). These entries exhibited very good yield stability or the ability to adapt to a wide range of production environments by being in the top-performance group for yield at more than 43% of the test locations for the past three years. The top yield frequency entries for yield in 2006 included **SD 3868, SD 3942, and Traverse at 71%; SD 3860, SD 3870, and SD 3943 at 57%;** and **Forage, Howard, Oxen, Reeder, and SD 3879 at 43%** of the test locations**.** The top bushel weight entries (based on state averages in table 1b) included **two entries at 62 lbs; eleven entries at 61 lbs; sixteen entries at 60 lbs, and six entries at 59 lbs** for year 2006. The check variety **Chris (36 inches)** tended to be the tallest variety across all locations in 2006 followed by the entries **SD 3879 at 33 inches, and CS3100-Q~W, Granger, Russ, SD 3860, SD 3934, SD 3868, and Traverse at 32 inches** tall in 2006 (Tables 2b). The top protein entries on a state average basis included **Chamberlin at 16.6%, Granite at 16.2%, Kelby at 16.1%,** and **Alsen at 15.8%** protein content.

Oat (Tables 2a-b) - The top performing entries for yield for the past 3-years (2004-06) by variety and top yield frequency included **HiFi, Morton, Loyal, and Stallion at 100%;** and **Jerry at 60%** (table 2a.). These varieties exhibited very good yield stability or the ability to adapt to a wide range of production environments by being in the top-performance group for yield at more than 60% of the test locations for the past three years. The top-performing entries for yield in 2006 were the experimental lines **SD 011315-15 at 83%; SD 020701 and SD 030888 at 67%;** and **Baker, Beach, Souris, SD 030324, and SD 021021 at 50%** of the test locations. In 2006, on a state basis, **the hull-less entries Buff, Paul, and Stark at 44, 42, and 40 pounds,** respectively, had the best bushel or test weight average across all locations (table 2b). Among the standard hulled entries the varieties **Hytest, Beach, and Stallion at 39**

pounds followed by **Loyal, SD 020883, SD 020536, SD 030888 at 38 pounds** were the highest in bushel weight. In contrast, **GG-304 at 30 lbs** was the lowest state bushel weight among the standard hulled varieties. Among all entries **Hytest at 36 inches** was the tallest and **GG-304 at 21 inches** was the shortest in height. In 2006, there was little if any lodging across the state (table 2b). The **standard variety Hytest at 19.5%** and **t**he **hull-less varieties Buff and Paul at 18.2%** exhibited the highest grain protein levels.

Barley (Tables 3a-b) - The top performing entries for yield for the past 3-years (2004-06) by variety and top yield frequency included **Eslick at 100%; Haxby at 83%; Excel at 67%; and Conlon, Lacey, and Tradition at 50%** (table 3a). These varieties exhibited very good yield stability or the ability to adapt to a wide range of production environments by being in the top-performance group for yield at more than 50% of the test locations for the past three years. The top-performing entries for yield in 2006 included **Eslick at 83%; and Haxby and Rawson at 67%** of the test locations. The **hull-less varieties Stanuwax and Meresse weighed 4 to 5 lbs higher** in bushel weight than the **two-row varieties Eslick and Conlon which in turn weighed 1 to 2 pounds** higher than the other varieties across all locations (tables 3b*)*. In contrast, the variety **Stellar-ND** tended to have the lowest bushel weight average across the state. The varieties **Robust, Tradition, Drummond, and Legacy** tended to be the tallest varieties across all statewide locations (table 3b). As seen in table 3b, the **lodging scores for the Conlon and Pronghorn were higher than for the other entries** and indicated these varieties tended to lodge slightly more than the other entries in 2006. The grain protein content ranged from 12.6 to 16.3% across the state. At the East River locations (table 3b) the protein ranged 5% from about 13.3 to 17.3%.

The efforts of the following people are gratefully acknowledged:

SDSU Oat Breeding Project, Brookings, SD- L. Hall
SDSU Spring Wheat Breeding Project, Brookings, SD- K. Glover and S. Hawks.
Northeast Research Farm, South Shore, SD- J. Smolik and A. Heuer

Table 1a. HRS wheat yield results - Five South Dakota East River locations, 2004-2006.

Variety (Hdg.)* - sorted by 3-yr then 2006 state avg.	Location Yield Avg. (Bu/A) at 13% moist.										State Yield Avg. (Bu/A)		State Top-Yield Freq. ** (%)	
	Brookings		So. Shore		Spink Co.		Selby		Brown Co.					
	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr
Traverse (0)	58+	63+	53+	59+	65	66+	57+	53+	62+	69+	52	55	71	86
SD 3868	53+	56+	46	56+	68+	70+	53	52+	59+	67+	50	54	71	100
Granger (0)	51	55+	46	53+	65	65+	61+	52+	53	63+	49	52	14	86
Briggs (0)	53+	57+	47	54+	63	67+	52	51+	56+	64+	48	52	29	86
SD 3860	54+	57+	46	51	63	63+	48	43	55+	61	49	51	57	57
Steele-ND (3)	50	53	49+	55+	64	65+	54	49+	54	61	48	51	29	71
Knudson (2)	52	56+	42	52	60	65+	50	47+	48	61	45	50	14	43
Freyr (1)	49	51	46	51	63	60	54	47+	55+	63+	48	49	29	57
Glenn (3)	45	49	42	52	59	63+	50	46	53	59	45	49	14	29
Oxen (2)	52	48	48	46	71+	61	55	47+	51	61	50	48	43	43
Forge (-1)	53+	50	45	47	67	60	51	47+	49	57	48	48	43	43
Walworth (0)	52	50	41	45	66	61	50	47+	54	59	47	48	14	29
Ulen (2)	47	49	43	48	64	63+	49	45	60+	62+	47	48	29	29
Reeder (3)	47	48	43	43	59	57	56+	42	57+	62+	48	47	43	43
Trooper (-1)	54+	51	40	44	64	62	51	47+	49	60	46	47	14	14
Russ (2)	45	49	43	47	53	56	50	43	56+	61	45	47	14	29
Alsen (4)	46	45	45	48	59	58	51	44	53	58	45	46	14	0
Granite (5)	45	47	39	40	56	57	52	44	56+	58	44	45	14	0
Chris,CK (3)	41	39	36	36	50	45	42	37	55+	49	40	38	14	0
SD 3942	57+	.	48	.	69+	.	50	.	59+	.	51	.	71	.
SD 3870	54+	.	45	.	72+	.	52	.	57+	.	50	.	57	.
SD 3943	59+	.	52+	.	65	.	51	.	56+	.	50	.	57	.
Howard (4)	49	.	50+	.	63	.	50	.	59+	.	49	.	43	.
SD 3879	52	.	46	.	65	.	53	.	59+	.	49	.	43	.
SD 3851	51	.	42	.	63	.	45	.	51	.	47	.	29	.
SD 3941	52	.	46	.	60	.	47	.	56+	.	47	.	29	.
Norris (0)	48	.	46	.	63	.	52	.	54	.	47	.	0	.
SD 4001	55+	.	40	.	61	.	49	.	53	.	46	.	0	.
CS3100L~W (6)	46	.	44	.	54	.	49	.	63+	.	45	.	14	.
Kelby (2)	46	.	43	.	60	.	49	.	53	.	45	.	0	.
CS3100Q~W (3)	43	.	41	.	58	.	46	.	59+	.	44	.	14	.
Banton (1)	47	.	43	.	63	.	45	.	46	.	44	.	0	.
SD 3927	46	.	43	.	57	.	45	.	50	.	44	.	0	.
SD 4002	52	.	39	.	60	.	43	.	52	.	44	.	0	.
Chamberlin (0)	39	.	39	.	56	.	40	.	42	.	39	.	0	.
SD 3934	39	.	39	.	57	.	23	.	41	.	37	.	37	.
Test avg. :	49	51	44	49	62	61	49	46	54	61				
High avg. :	59	63	53	59	72	70	61	53	63	69				
Low avg. :	39	39	36	36	50	45	23	37	41	49				
# Lsd(.05) :	6	8	4	6	4	7	5	6	8	7				
## TPG-value :	53	55	49	53	68	63	56	47	55	62				
### C.V. :	8	7	7	7	5	7	7	8	10	7				

* Heading, the relative days to heading, compared to the variety - Briggs. ** Frequency or percent of all test locations that a variety was in the TPG for yield. # Lsd, the amount two values in a column must differ to be significantly different.

TPG-value, the minimum value required for the top-performance group (TPG) for yield.

Coef. of variation, a measure of trial experimental error, 15% or less is best.

Table 1b. HRS wheat averages for bushel weight (BW), and lodging (LDG) by location along with state averages for height (HT), and grain protein (PRT) for 2006.

Variety (Hdg.)* - sorted by state BW avg.	Location Avg. - BW, HT, LDG										State Avg. - BW, HT, LDG, PRT			
	Brookings		South Shore		Spink Co.		Selby		Brown Co.					
	BW lb	LDG **	BW lb	LDG **	BW lb	LDG **	BW lb	LDG **	BW lb	LDG **	BW lb	HT in	LDG **	PRT %
SD 3927	64+	1+	62+	1+	59	1+	62+	1+	64+	1+	62	30	1	15.7
SD 3941	63+	1+	62+	1+	60	1+	62+	1+	64+	1+	62	30	1	15.1
Chamberlin (0)	63+	1+	62+	1+	59	1+	61+	1+	63+	1+	61	28	1	16.6
Glenn (3)	64+	1+	62+	1+	60	1+	62+	1+	62+	1+	61	31	1	15.2
SD 3860	64+	1+	61+	1+	57	1+	62+	1+	64+	1+	61	32	1	14.4
SD 3851	63+	1+	61+	1+	60	1+	62+	1+	62+	1+	61	31	1	14.8
Trooper (-1)	63+	1+	60	1+	60	1+	62+	1+	63+	1+	61	27	1	15.0
SD 3942	63+	1+	61+	1+	60	1+	62+	1+	63+	1+	61	28	1	14.3
Banton (1)	62	1+	61+	1+	59	1+	62+	1+	62+	1+	61	30	1	15.6
SD 3879	63+	1+	59	1+	60	1+	62+	1+	64+	1+	61	33	1	15.1
Forge (-1)	65+	1+	61+	1+	59	1+	62+	1+	60	1+	61	30	1	14.4
Freyr (1)	62	1+	61+	1+	60	1+	62+	1+	62+	1+	61	31	1	15.0
Norris (0)	63+	1+	60	1+	60	1+	62+	1+	63+	1+	61	29	1	15.6
SD 3943	63+	1+	61+	1+	61	1+	62+	1+	62+	1+	60	29	1	14.7
SD 4001	64+	1+	61+	1+	59	1+	61+	1+	62+	1+	60	30	1	15.3
Kelby (2)	63+	1+	63+	1+	57	1+	62+	1+	61	1+	60	26	1	16.1
Ulen (2)	62	1+	59	1+	60	1+	62+	1+	61	1+	60	31	1	15.5
Granite (5)	64+	1+	60	1+	59	1+	62+	1+	62+	1+	60	28	1	16.2
CS3100Q~W (3)	63+	1+	60	1+	59	1+	61+	1+	64+	1+	60	32	1	14.8
Howard (4)	63+	1+	59	1+	59	1+	61+	1+	64+	1+	60	31	1	14.6
SD 4002	64+	1+	61+	1+	58	1+	60	1+	62+	1+	60	30	1	14.4
Granger (0)	62	1+	60	1+	58	1+	62+	1+	62+	1+	60	32	1	14.8
Alsen (4)	61	1+	60	1+	60	1+	62+	1+	61	1+	60	30	1	15.8
Briggs (0)	62	1+	59	1+	59	1+	61+	1+	63+	1+	60	30	1	15.1
Reeder (3)	62	1+	59	1+	58	1+	62+	1+	62+	1+	60	30	1	14.8
Russ (2)	62	1+	60	1+	57	1+	60	1+	63+	1+	60	32	1	15.2
Oxen (2)	62	1+	60	1+	58	1+	62+	1+	58	1+	60	29	1	15.2
Steele-ND (3)	62	1+	60	1+	58	1+	61+	1+	61	1+	60	31	1	15.4
SD 3934	62	1+	60	1+	57	1+	62+	1+	60	1+	60	32	1	15.0
Knudson (2)	62	1+	60	1+	58	1+	61+	1+	58	1+	59	28	1	15.1
Walworth (0)	62	1+	59	1+	57	1+	61+	1+	61	1+	59	30	1	15.2
Chris,CK (3)	62	1+	59	1+	57	1+	59	1+	63+	2	59	36	1	15.6
Traverse (0)	61	1+	59	1+	58	1+	59	1+	61	1+	59	32	1	14.3
SD 3868	61	1+	58	1+	58	1+	59	1+	62+	1+	59	32	1	14.3
SD 3870	61	1+	58	1+	59	1+	59	1+	62+	1+	59	31	1	14.6
CS3100L~W (6)	62	1+	58	1+	56	1+	60	1+	64+	1+	.	25	1	14.3
Test avg. :	63	1	60	1	59	1	61	1	62	1				
High avg. :	65	1	63	1	61	1	62	1	64	1				
Low avg. :	61	1	58	1	56	1	59	1	58	1				
# Lsd(.05) :	2	NS^	2	NS^	2	NS^	1	NS^	2	NS^				
## TPG-value :	63	1	61	1	59	1	61	1	62	1				
### C.V. :	2	0	2	0	3	0	0	0	3	9				

* Heading, the relative days to heading, compared to the variety - Briggs. ** Lodging score: 0= all plants erect, 3= 50% of plants lodged at 45o-angle, 5= all plants flat. # Lsd, the amount two values in a column must differ to be significantly different. ## TPG-value, the minimum or maximum value required for the top-performance group (TPG). A plus sign (+) indicates values within a column that qualify for the TPG. ### Coef. of variation, a measure of trial experimental error. ^ Variable differences within a column are non-significant (NS) at the .05 level of probability.

Table 2a. Oat yield results - South Dakota East River locations, 2004-2006.

Variety (Hdg.)* - sorted by 3-yr then 2006 state average	Location Yield Avg. (Bu/A at 13% moist.)								State Yield Avg. (Bu/A)		State Yield Freq. ** (%)	
	Brookings		So. Shore		Beresford		Brown Co.					
	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr
HiFi (8)	129	143+	112	143+	137	131+	112+	128+	100	119	17	100
Stallion (8)	136+	132+	120	131+	139	139+	96	118+	100	115	17	100
Morton (7)	117	130+	112	138+	132	127+	97	115+	94	113	0	100
Loyal (8)	124	133+	112	127+	130	125+	99	108+	94	109	0	100
Jerry (5)	111	120	114	118	103	121+	50	100+	80	103	0	60
Don (1)	105	115	110	116	103	113	53	98	79	99	17	0
Reeves (2)	101	110	106	113	99	111	48	96	74	95	0	20
Hytest (4)	91	102	100	107	85	86	71	95	73	88	0	20
Buff, Hls (3)	88	96	91	102	79	92	48	73	64	81	0	0
Stark, Hls (6)	76	86	70	95	48	79	70	80	54	74	0	0
Paul, Hls (7)	78	83	77	92	75	70	77	83	63	72	0	0
SD 011315-15	142+	.	130+	.	137	.	103+	.	106	.	83	.
SD 030324	140+	.	123	.	151+	.	116+	.	106	.	50	.
Souris (5)	134+	.	123	.	133		118	.	104	.	50	
SD 020701	125	.	125+	.	144+	.	92	.	101	.	67	.
SD 021021	124	.	124+	.	137	.	103+	.	101	.	50	.
SD 030888	140+	.	132+	.	144+	.	75	.	101	.	67	.
SD 020536	123	.	115	.	146+	.	102+	.	100	.	50	.
Baker (4)	125	.	118	.	131	.	98	.	98	.	33	.
Beach (6)	127	.	118	.	123	.	100+	.	97	.	50	.
SD 031128	118	.	128+	.	125	.	62	.	91	.	34	.
Maida (7)	114	.	110	.	124	.	78	.	88	.	17	.
SD 020883	93	.	112	.	117	.	49	.	79	.	17	.
GG-304	94	.	96	.	63	.	69	.	69	.	0	.
Test avg.:	115	114	112	117	117	109	83	99				
High avg. :	142	143	132	143	151	139	118	128				
Low avg. :	76	83	70	92	48	70	48	73				
# Lsd(.05) :	9	20	8	16	11	24	18	29				
## TPG-value :	133	123	124	127	140	115	100	99				
### C.V. :	5	8	5	7	7	12	15	10				

* Heading, the relative days to heading, compared to the variety - Don.

Lsd, the amount two values in a column must differ to be significantly different.

TPG-value, the minimum value required for the top-performance group (TPG) for yield.

A plus sign (+) indicates values within a column that qualify for the TPG.

Coef. of variation, a measure of trial experimental error, 15% or less is best.

** Frequency or percent of all test locations that a variety was in the TPG for yield.

Table 2b. Oats averages for bushel weight (BW), Height (HT), lodging (LDG) by location along with the state average for grain protein (PRT) in 2006.

Variety (Hdg.)* - sorted by state BW avg.	Location Avg. - BW, HT, LDG												State Avg. - BW, HT, LDG, PRT			
	Brookings			South Shore			Beresford			Brown Co.						
	BW lb	HT in	LDG **	BW lb	HT in	LDG **	BW lb	HT in	LDG **	BW lb	HT in	LDG **	BW lb	HT in	LDG **	PRT %
Buff, Hls (3)	45+	35	1+	42+	33	1+	46+	35	1+	44+	27	1+	44	29	1	18.2
Paul, Hls (7)	42	42	2+	41+	37	1+	42	38	1+	46+	32	1+	42	33	1	18.2
Stark, Hls (6)	41	42	1+	41+	37	1+	40	38	1+	42	32	1+	40	34	1	17.8
Hytest (4)	39	42	3	41+	40	3	41	40	1+	39	36	1+	39	36	1	19.5
Beach (6)	38	42	2+	43+	39	2+	40	40	1+	39	33	1+	39	34	1	15.5
Stallion (8)	39	42	2+	40	37	2+	41	40	1+	39	33	1+	39	34	1	17.2
SD 030888	40	33	2+	38	31	1+	40	32	1+	38	27	1+	38	27	1	15.9
SD 020536	38	39	2+	37	33	3	40	34	1+	39	29	1+	38	30	1	16.2
SD 020883	39	37	2+	38	35	2+	38	34	1+	36	29	1+	38	31	1	17.2
Loyal (8)	38	41	2+	40	38	3	40	38	1+	38	34	1+	38	34	1	17.8
SD 031128	38	39	1+	38	37	1+	39	36	1+	35	29	1+	37	32	1	16.3
SD 020701	36	40	2+	39	36	3	39	37	1+	37	33	1+	37	33	1	16.5
Souris (5)	37	36	1+	38	33	2	38	34	1+	38	29	1+	37	29	1	15.9
SD 011315-15	36	41	2+	36	36	2+	39	37	1+	39	30	1+	37	32	1	15.5
Jerry (5)	38	40	2+	36	38	2+	39	37	1+	34	31	1+	37	32	1	16.6
Morton (7)	38	43	1+	38	37	1+	38	40	1+	37	35	1+	37	34	1	16.5
Reeves (2)	37	39	2+	38	37	3	38	38	1+	33	32	1+	36	33	1	16.1
SD 030324	34	42	2+	38	38	3	40	38	1+	38	33	1+	36	34	1	16.3
Maida (7)	36	42	2+	38	37	2+	36	40	1+	37	32	1+	36	34	1	17.4
SD 021021	37	37	1+	37	34	1+	38	35	1+	38	30	1+	36	30	1	17.6
HiFi (8)	36	42	1+	36	36	1+	38	37	1+	36	32	1+	36	33	1	15.6
Don (1)	36	32	2+	36	32	1+	37	32	1+	34	26	1+	36	28	1	15.6
Baker (4)	34	38	1+	36	35	1+	38	36	1+	35	31	1+	35	32	1	15.9
GG-304	29	25	1+	28	23	1+	31	24	1+	34	20	1+	30	21	1	16.1
Test avg. :	37	39	2	38	35	2	39	36	1	38	30	1				
High avg. :	45	43	3	43	40	3	46	40	1	46	36	1				
Low avg. :	29	25	1	28	23	1	31	24	1	33	20	1				
# Lsd(.05) :	2	2	1	2	2	1	2	2	NS^	3	3	NS^				
## TPG-value :	43	.	2	41	.	2	44	.	1	43	.	1				
### C.V. :	4	3	35	4	3	26	4	3	0	5	7	0				

* Heading, the relative days to heading, compared to the variety - Don.

** Lodging score: 0= all plants erect, 3= 50% of plants lodged at 45^{o}-angle, 5= all plants flat.

Lsd, the amount two values in a column must differ to be significantly different.

TPG-value, the minimum or maximum value required for the top-performance group (TPG). A plus sign (+) indicates values within a column that qualify for the TPG.

Coef. of variation, a measure of trial experimental error.

^ Variable differences within a column are non-significant (NS) at the .05 level of probability.

Table 3a. Barley yield results- Five South Dakota East River locations, 2004-2006.

Variety (Hdg.)*- sorted by 3-yr then 2006 state avg.	Location Yield Avg. (Bu/A at 13% moist.)										State Yield Avg. (Bu/A)		State Top-Yield Freq. ** (%)	
	Brookings		So. Shore		Miller		Selby		Brown Co.					
	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr	2006	3-Yr
Eslick (3)	96+	97+	78	94+	56+	72+	95+	90+	81+	88+	71	77	83	100
Haxby (2)	86	87	90+	99+	42	69+	94+	83+	79+	81+	71	75	67	83
Lacey (0)	77	84	78	91+	51+	62	72	82+	64	87+	62	71	17	50
Excel (3)	82	86	75	87	44	63+	77	83+	72+	86+	61	71	34	67
Tradition (0)	62	77	76	92+	37	59	71	78+	65	84+	55	69	0	50
Drummond (2)	69	76	77	88	36	56	73	82+	68	81+	58	68	0	33
Legacy (3)	78	81	72	88	40	57	73	77+	57	85	57	68	0	17
Conlon (0)	61	68	82	90	54+	65+	70	69	65	80+	60	65	17	50
Stellar-ND (2)	74	81	69	84	38	55	63	77+	63	79+	53	65	0	33
Robust (3)	68	76	71	77	36	51	53	65	68	75	52	61	0	17
Rawson (2)	81	.	84+	.	50+	.	74	.	74+	.	66	.	67	.
Meresse~ (2)	55	.	59	.	36	.	60	.	63	.	50	.	0	.
Pronghorn~ (3)	52	.	54	.	41	.	52	.	60	.	45	.	0	.
Stanuwax~ (1)	54	.	58	.	37	.	49	.	52	.	45	.	0	.
Test avg. :	71	81	73	89	43	61	70	79	67	83				
High avg. :	96	97	90	99	56	72	95	90	81	88				
Low avg. :	52	68	54	77	36	51	49	65	52	75				
# Lsd(.05) :	7	9	7	8	7	9	9	14	10	12				
## TPG-value :	89	88	83	91	49	63	86	76	71	76				
### C.V. :	6	9	7	7	11	8	9	8	11	8				

* Heading, the relative days to heading, compared to the variety - Lacey.

~ Hull-less type, used in food.

Lsd, the amount two values in a column must differ to be significantly different.

TPG-value, the minimum value required for the top-performance group (TPG) for yield.

A plus sign (+) indicates values within a column that qualify for the TPG.

Coef. of variation, a measure of trial experimental error, 15% or less is best.

** Frequency or percent of all test locations that a variety was in the TPG for yield.

Table 3b. Barley averages for bushel weight (BW) and lodging (LDG) by location along with state averages for height (HT) and grain protein (PRT) for 2006.

Variety (Hdg.)* - sorted by state BW avg.	Location Avg. - BW, HT, LDG										State Avg. - BW, HT, LDG, PRT			
	Brookings		South Shore		Miller		Selby		Brown Co.					
	BW lb	LDG **	BW lb	LDG **	BW lb	LDG **	BW lb	LDG **	BW lb	LDG **	BW lb	HT in	LDG **	PRT %
Stanuwax~ (1)	51	1+	53+	1+	57+	1+	58+	2	53	1+	54	24	1	15.3
Meresse~ (2)	55+	1+	51+	1+	56+	1+	58+	2	56+	1+	53	22	1	16.3
Haxby (2)	51	1+	51+	1+	50	2	53	2	51	1+	50	24	1	13.1
Eslick (3)	51	1+	47	1+	51	2	53	3	52	1+	49	24	1	12.6
Conlon (0)	49	3	44	3	50	3	53	3	49	1+	48	24	2	13.3
Pronghorn~ (3)	48	2	45	2	53	3	52	3	52	1+	48	24	2	15.4
Rawson (2)	49	1+	46	1+	50	1+	50	1+	49	1+	47	25	1	13.8
Tradition (0)	49	1+	47	1+	48	1+	51	2	47	1+	47	26	1	13.7
Robust (3)	49	1+	46	3	47	1+	51	2	49	1+	46	26	1	13.7
Lacey (0)	48	1+	46	3	49	1+	52	2	46	1+	46	25	1	13.7
Drummond (2)	48	1+	47	2	46	1+	50	2	46	1+	46	26	1	14.1
Excel (3)	48	1+	46	3	49	1+	51	2	48	1+	46	25	1	13.3
Legacy (3)	48	1+	44	3	48	1+	51	2	46	1+	46	25	1	13.7
Stellar-ND (2)	47	1+	45	2	48	1+	49	2	46	1+	45	25	1	13.7
Test avg. :	49	1	47	2	50	1	52	2	49	1				
High avg. :	55	3	53	3	57	3	58	3	56	1				
Low avg. :	47	1	44	1	46	1	49	1	46	1				
# Lsd(.05) :	2	0	3	0	1	1	2	1	2	NS+				
## TPG-value :	53	1	50	1	56	1	56	1	54	1				
### C.V. :	2	16	4	20	2	28	2	19	3	0				

* Heading, the relative days to heading, compared to the variety - Lacey.

** Lodging score: 0= all plants erect, 3= 50% of plants lodged at 45^{o}-angle, 5= all plants flat.

~ Hull-less type, used for food.

Lsd, the amount two values in a column must differ to be significantly different.

TPG-value, the minimum or maximum value required for the top-performance group (TPG). A plus sign (+) indicates values within a column that qualify for the TPG.

Coef. of variation, a measure of trial experimental error.

2006 Soybean Variety Performance Trials – South Shore and Warner

Robert G. Hall, Extension agronomist - crops/Manager - crop testing
Kevin K. Kirby, Agricultural research manager – crop testing

General Test Procedures

Test plots consisted of 4-row plots, 20 feet long, and three replications. A row spacing of 30 inches and seeding rate of 165,000 seeds per acre was used in all plots. The seed furrow was inoculated with Nitragin brand Soybean Soil Implant down the seed tube using label rates at planting. Seeding was accomplished using a Monosem precision row crop planter. In the Roundup Ready plots weed control consisted of a post application of Roundup once at Warner and twice at South Shore. Weed control in the Non-Roundup Ready plots at South Shore consisted of a post split application of Harmony and Poast at label rates. The center two rows of each 4-row plot were harvested with Massey Ferguson 8XP small plot combine.

Yield: Plots were harvested at 15% seed moisture or less. Yields were calculated on a 13% moisture content basis and expressed in bushels per acre.

Variety maturity: Maturity is reported as "Days to maturity" or DTM. Each value was obtained by averaging two replicates for the number of days from seeding to maturity (95% of pods brown). If the DTM value is missing the entry did not reach maturity before the first killing frost.

Lodging Score: Scores at maturity are based on average erectness of the main stem of plants within each variety. 1 = all plants erect, 2 = slight lodging, 3 = lodging at a 45 degree angle, 4 = severe lodging, and 5 = all plants flat.

Protein and Oil Content: A sub-sample from each replication (3 in total) of each variety was combined, mixed, re-sampled, and tested for protein and oil. The analysis was done using a FOSS TECATOR Model Infratec 1229 grain analyzer. Samples of known protein and oil previously tested by the SDSU Agricultural Experiment Station Biochemistry Laboratory were then used to calibrate the analyzer. Protein and oil values were adjusted to 13% moisture.

The efforts of Jim Smolik and Al Heuer, Northeast Research Farm, South Shore, SD and Allen & Inel Ryckman Farm (farm cooperators), Warner, SD in obtaining the data are gratefully acknowledged.

Roundup Ready™ Soybean Variety Trial Results – South Shore & Warner

Note: Yields are reported as 2006 averages or 2-yr averages (2005-06).

South Shore, Group-0 varieties (Tables 1a & 1b): The 2006 and two-year test yield averages were **30** and **40** bushels per acre, respectively (Table 1a)**.** Varieties had to average 30 bushels or higher to be in the top yield group for 2006. Likewise, varieties had to average 36 bushels or higher to be in the top yield group for two years. Variety yield averages had to differ by 5 bushels in 2006 to be significantly different, while yield averages for two years were not significantly different. The 2006, the protein, oil, and lodging score test averages were **37.1%, 18.9% and 1**, respectively (Table 1b)**.** The lodging score average of 1 and LSD value of 0 indicated lodging did not occur.

Warner, Group-0 varieties (Tables 1a & 1b): The 2006 and two-year test yield averages were **33** and **42** bushels per acre, respectively (Table 1a)**.** Varieties had to average 36 bushels or higher to be in the top yield group for 2006. Likewise, varieties had to average 39 bushels or higher to be in the top yield group for two years. Variety yield averages had to differ by 4 bushels in 2006 to be significantly different, while yield averages for two years were not significantly different. In 2006, the protein, oil, and lodging score test averages were **36.2%, 19.7%, and 1**, respectively (Table 1b)**.** The lodging score average of 1 and LSD value of 0 indicated lodging did not occur.

Northern test zone, Group-0 varieties (Tables 1a & 1b): The 2006 and two-year test yield averages in the Northern zone were **32** and **41** bushels per acre, respectively (Table 1a)**.** Varieties had to average 36 bushels or higher to be in the top yield group for 2006 and 42 bushels or higher to be in the top yield group for two years. Variety yield averages had to differ by 3 bushels in 2006 and 2 bushels for two years to be significantly different. The 2006 protein, oil, and lodging score test averages were **36.6%, 19.3%,** and **1**, respectively, across both locations (Table 1b)**.** The lodging score average of 1 and LSD value of 0 indicated lodging did not occur at either location.

South Shore, Group-I varieties (Tables 2a & 2b): The 2006 and two-year test yield averages were **27** and **37** bushels per acre, respectively (Table 2a)**.** Varieties had to average 28 bushels and 34 bushels or higher to be in the top yield group for 2006 and for two years, respectively. Variety yield averages had to differ by 4 bushels in 2006 to be in the top performance group for yield, while the two-year averages were not significantly different. The 2006 protein, oil, and lodging score test averages were **37.0%, 18.8%,** and **1**, respectively (Table 2b)**.** The lodging score average of 1 and LSD value of 0 indicated lodging did not occur.

Warner, Group-I varieties (Tables 2a & 2b): The 2006 and two-year test yield averages were **34** and **42** bushels per acre, respectively (Table 2a)**.** Varieties had to average 24 bushels and 36 bushels or higher to be in the top yield group for 2006 and for two years, respectively. Variety yield averages had to differ by 5 bushels in 2006 to be significantly different, while the yield averages for two years did not differ significantly. The 2006 protein, oil, and lodging score test averages were **36.1%, 19.5%,** and **1**, respectively (Table 2b)**.** The lodging score average of 1 and LSD value of 0 indicated lodging did not occur.

Northern test zone, Group-I varieties (Tables 2a & 2b): The yield averages were **31** and **40** bushels per acre for 2006 and for two years, respectively (Table 2a)**.** Varieties had to average 33 bushels or higher in 2006 to be in the top yield group. Yield differences for two years could not be determined because of the high coefficient of variation (CV) of 29% for this zone. The high level of experimental error associated with this trial for two years indicated yield differences among varieties were not valid. Variety yield averages had to differ by 3 bushels in 2006 to be significantly different from one another. Again, the high CV associated with the two-year yields prevented a valid determination of how much any two varieties had to differ in yield to be significantly different over both locations. The 2006 protein, oil, and lodging score test averages were **36.5%, 19.1%, and 1**, respectively, across both locations (Table 2b)**.** The lodging score average of 1 and LSD value of 0 indicated lodging did not occur at either location.

Non-Roundup Ready™ Soybean Variety Trial Results – South Shore

Note: Yields are reported as 2006 averages or 2-yr averages (2005-06).

South Shore, Group-0 varieties (Tables 3a & 3b): The 2006 and two-year test yield averages were **24** and **33** bushels per acre, respectively (Table 3a)**.** Varieties had to average 28 bushels or higher in 2006 and 33 bushels or higher for two years to be in the top yield group. Variety yield averages had to differ by 3 bushels in 2006 to be significantly different; while there were no significant differences in yield among the varieties tested two years. The 2006 protein, oil, and lodging score test averages were **37.3%, 18.9%,** and **1**, respectively (Table 3b)**.** The lodging score average of 1 and LSD value of 0 indicated lodging did not occur.

South Shore, Group-I varieties (Tables 3a & 3b): The 2006 and two-year test yield averages were **23** and **34** bushels per acre, respectively (Table 3a)**.** Varieties had to average 23 bushels or higher in 2006 and 33 bushels or higher for two years to be in the top performance group for yield. Variety yield averages had to differ by 3 bushels or more in 2006 to be significantly different. There were no significant yield differences among the three varieties tested for two years. The 2006 protein, oil, and lodging score test averages were **36.3%, 19.0%,** and **1**, respectively (Table 3b)**.** The lodging score average of 1 and LSD value of 0 indicated lodging did not occur.

Table 1a. Roundup Ready maturity group-0 soybean variety yield averages- Northern sites, 2005-06.

Brand/Variety (By 2-yr then 2006 zone yield)	DTM*	Yield Averages by Location				Northern Zone Averages	
		South Shore		Warner			
		Bu/Acre 2006	Bu/Acre 2-Yr	Bu/Acre 2006	Bu/Acre 2-Yr	Bu/Acre 2006	Bu/Acre 2-Yr
KRUGER/ K-098RR	116	32	41	38	46	35	44
NUTECH/ NT-0889RR	117	32	40	40	46	36	43
MUSTANG/ M-095RR	117	33	42	37	44	35	43
NUTECH/ NT-0886RR	117	30	42	37	44	34	43
PSI BRAND/ 96090RR	115	28	39	40	46	34	43
PRAIRIE BRAND/ PB-0725RR	115	32	43	30	42	31	43
MUSTANG/ M-096RR	118	35	42	36	42	36	42
SEEDS 2000/ 2090RR	117	32	41	35	42	34	42
WENSMAN/ W 2090RR	116	29	39	35	43	32	41
DAIRYLAND/ DSR-0701/RR	113	32	41	30	40	31	41
MUSTANG/ M-075RR	113	28	41	29	41	29	41
KRUGER/ K-056RR	112	32	40	30	40	31	40
PRAIRIE BRAND/ PB-0923RR	113	28	37	33	42	31	40
PRAIRIE BRAND/ PB-0954RR	116	29	37	35	41	32	39
SODAK GENET./ SD1092RR	116	30	38	32	40	31	39
MUSTANG/ M-066RR	112	26	37	31	40	29	39
SODAK GENET./ SD1091RR	117	29	36	32	39	31	38
THUNDER/ 709RR	117	31	.	38	.	35	.
KRUGER/ K-072RR	116	34	.	35	.	35	.
PRAIRIE BRAND/ PB-0936RR	116	33	.	36	.	35	.
MUSTANG/ M-097RR	117	32	.	36	.	34	.
NUTECH/ NT-0990RR	116	30	.	38	.	34	.
KRUGER/ EXP057RR	113	35	.	31	.	33	.
DAIRYLAND/ DSR-0903/RR	113	33	.	32	.	33	.
MIDWEST SEED/ GR0903	117	30	.	35	.	33	.
ASGROW/ AG0803	113	29	.	34	.	32	.
KRUGER/ K-042RR	113	33	.	31	.	32	.
KRUGER/ EXP086RR	115	30	.	33	.	32	.
PUBLIC/ SD00-5555R	118	25	.	38	.	32	.
WECO/ EXP 6 0.7RR	116	30	.	32	.	31	.
PUBLIC/ SD1091RR-4	118	27	.	35	.	31	.
THUNDER/ 708RR	113	31	.	29	40	30	.
HEFTY/ EXP067RR	111	30	.	30	.	30	.
DAIRYLAND/ DSR0902RRSTS	114	25	.	33	.	29	.
NORTHSTAR/ NS 0911RR	114	24	.	34	.	29	.
NUTECH/ NT-0786RR	113	26	.	30	.	28	.
PSI/ 96081RR	113	28	.	28	.	28	.
KRUGER/ EXP067RR	111	27	.	29	.	28	.
NORTHSTAR/ NS 0810RR	113	28	.	26	.	27	.
CROW'S/ C0520R	112	25	.	26	.	26	.
AGVENTURE/ AVEXP09D1	112	.	.	36	.	.	.
GOLD COUNTRY SEED/ 2509R	111	.	.	39	44	.	.
STINE/ 0943-4	110	.	.	34	43	.	.
STINE/ 0708-4	121	30	41	.	.	.	.
Test avg. :	115	30	40	33	42	32	41
# Lsd (.05):		5	NS	4	NS	3	2
## TPG-avg. :		30	36	36	39	36	42
@ Coef. Var.:		9	7	8	6	9	6

* DTM= average days from seeding (South Shore-May 23, Warner-May, 2006) to maturity; a missing value indicates the site received a hard frost before the variety reached maturity.

Lsd,(.05)= amount values in a column must differ to be significantly different, if differences are not significant (NS), NS is indicated.

TPG-avg. = minimum value to qualify for top performance group.

@ Coef. Var.= a measure of trial experimental error, 15% or less is best.

Table 1b. Roundup Ready maturity group-0 soybean variety protein, oil, & lodging Northern averages, 2006.

Brand/Variety (By 2006 zone protein)	DTM*	Averages by Location						Northern Zone Averages		
		South Shore			Warner					
		Protein (%)	Oil (%)	Lodging (1-5)*	Protein (%)	Oil (%)	Lodging (1-5)*	Protein (%)	Oil (%)	Lodging (1-5)*
SODAK GENET./SD1091RR	117	38.2	18.7	1	37.3	19.3	1	37.8	19.0	1
WENSMAN/ W 2090RR	116	37.8	18.7	1	36.8	19.4	1	37.3	19.1	1
MUSTANG/ M-095RR	117	37.7	18.8	1	36.8	19.4	1	37.3	19.1	1
KRUGER/ K-098RR	116	37.3	18.9	1	37.0	19.3	1	37.2	19.1	1
NUTECH/ NT-0889RR	117	37.1	18.9	1	37.0	19.5	1	37.1	19.2	1
PRAIRIE BRAND/PB-0954RR	116	36.9	18.9	1	37.1	19.3	1	37.0	19.1	1
PSI BRAND/ 96090RR	115	37.3	18.6	1	36.6	19.5	1	37.0	19.1	1
PRAIRIE BRAND/PB-0923RR	113	37.5	19.0	1	36.4	19.7	1	37.0	19.4	1
PUBLIC/ SD00-5555R	118	37.4	18.7	1	36.5	19.6	1	37.0	19.2	1
MUSTANG/ M-066RR	112	37.7	18.9	1	36.1	19.7	1	36.9	19.3	1
PRAIRIE BRAND/PB-0725RR	115	37.1	19.0	1	36.7	19.7	1	36.9	19.4	1
SODAK GENET./SD1092RR	116	37.2	19.0	1	36.5	19.8	1	36.9	19.4	1
MIDWEST SEED/ GR0903	117	36.9	18.9	1	36.8	19.3	1	36.9	19.1	1
KRUGER/ K-056RR	112	37.3	19.0	1	36.3	19.5	1	36.8	19.3	1
NORTHSTAR/ NS 0911RR	114	37.6	18.7	1	36.0	19.7	1	36.8	19.2	1
SEEDS 2000/ 2090RR	117	37.1	18.7	1	36.5	19.5	1	36.8	19.1	1
NUTECH/ NT-0886RR	117	36.6	19.0	1	36.9	19.4	1	36.8	19.2	1
KRUGER/ K-072RR	116	36.8	19.0	1	36.7	19.6	1	36.8	19.3	1
DAIRYLAND/ DSR-0701/RR	113	37.4	18.8	1	36.1	19.8	1	36.8	19.3	1
PUBLIC/ SD1091RR-4	118	37.0	19.0	1	36.5	19.5	1	36.8	19.3	1
DAIRYLAND/ DSR-0903/RR	113	37.6	18.9	1	35.8	19.9	1	36.7	19.4	1
PRAIRIE BRAND/PB-0936RR	116	37.2	18.9	1	36.2	19.7	1	36.7	19.3	1
NUTECH/ NT-0990RR	116	37.1	18.7	1	36.2	19.7	1	36.7	19.2	1
CROW'S/ C0520R	112	37.1	19.3	1	36.1	19.8	1	36.6	19.6	1
MUSTANG/ M-096RR	118	36.8	19.0	1	36.3	19.6	1	36.6	19.3	1
NUTECH/ NT-0786RR	113	37.2	19.0	1	35.8	20.0	1	36.5	19.5	1
THUNDER/ 708RR	113	37.1	18.7	1	35.6	19.6	1	36.4	19.2	1
PSI/ 96081RR	113	37.1	18.9	1	35.6	20.0	1	36.4	19.5	1
KRUGER/ EXP057RR	113	36.9	18.9	1	35.8	20.0	1	36.4	19.5	1
WECO/ EXP 6 0.7RR	116	36.8	19.0	1	35.8	19.9	1	36.3	19.5	1
KRUGER/ K-042RR	113	37.4	19.1	1	35.2	20.5	1	36.3	19.8	1
KRUGER/ EXP067RR	111	37.2	18.9	1	35.4	19.7	1	36.3	19.3	1
NORTHSTAR/ NS 0810RR	113	37.2	18.9	1	35.4	20.2	1	36.3	19.6	1
HEFTY/ EXP067RR	111	36.9	18.9	1	35.5	19.6	1	36.2	19.3	1
MUSTANG/ M-075RR	113	36.8	19.0	1	35.5	20.0	1	36.2	19.5	1
MUSTANG/ M-097RR	117	36.9	19.0	1	35.4	19.9	1	36.2	19.5	1
KRUGER/ EXP086RR	115	36.3	18.7	1	35.8	19.5	1	36.1	19.1	1
THUNDER/ 709RR	117	36.6	19.4	1	35.2	19.9	1	35.9	19.7	1
ASGROW/ AG0803	113	36.2	19.2	1	35.5	19.6	1	35.9	19.4	1
DAIRYLAND/ DSR0902RRSTS	114	36.4	19.1	1	35.2	20.1	1	35.8	19.6	1
AGVENTURE/ AVEXP09D1	112	.	.	.	36.8	19.4	1	.	.	.
G. COUNTRY SEED/ 2509R	111	.	.	.	36.6	19.4	1	.	.	.
STINE/ 0943-4	110	.	.	.	36.6	19.7	1	.	.	.
STINE/ 0708-4	121	36.8	18.7	1	.	.	.	.	.	.
Test avg. :	115	37.1	18.9	1	36.2	19.7	1	36.6	19.3	1
# Lsd(.05) :		.	.	0	.	.	0	.	.	0
## TPG-avg. :		.	.	1	.	.	1	.	.	1
@ Coef. Var. :		.	.	0	.	.	0	.	.	0

* DTM= average days from seeding (South Shore- May 23, Warner- May 26, 2006) to maturity; a missing value indicates the site received a hard frost before the variety reached maturity. ** Lodging, 1= all plants erect, 5= all plant flat.

Lsd,(.05)= amount values in a column must differ to be significantly different, if differences are not significant (NS), NS is indicated.

TPG-avg. = minimum value to qualify for top performance group. @ Coef. Var.= a measure of trial experimental error.

Table 2a. Roundup Ready maturity group-I soybean variety yield averages- Northern locations, 2005-06.

Brand/Variety (By 2-yr then 2006 zone yield)	DTM*	Yield Averages by Location				Northern Zone Averages	
		South Shore		Warner			
		Bu/Acre 2006	Bu/Acre 2-Yr	Bu/Acre 2006	Bu/Acre 2-Yr	Bu/Acre 2006	Bu/Acre 2-Yr
PRAIRIE BRAND/ PB-1954RR	113	32	40	40	45	36	43
STINE/ 1330-4	118	29	39	38	46	34	43
WENSMAN/ W 2142RR	112	30	40	36	45	33	43
ASGROW/ AG1702	119	28	39	37	45	33	42
NUTECH/ NT-7205+RR	117	27	38	38	46	33	42
SEEDS 2000/ 2130RR	118	29	38	34	44	32	41
PRAIRIE BRAND/ PB-1525RR	118	29	39	32	43	31	41
WENSMAN/ W 2121RR	115	25	37	34	45	30	41
THOMPSON/ T-7234RR	115	27	39	32	42	30	41
NUTECH/ NT-1404RR	117	25	38	30	43	28	41
DEKALB/ DKB18-51	113	26	36	35	43	31	40
DAIRYLAND/ DSR-1301/RR	118	26	35	35	44	31	40
PRAIRIE BRAND/ PB-1294RR	116	27	37	32	43	30	40
KRUGER/ K-100RR	117	28	40	28	40	28	40
PRAIRIE BRAND/ PB-1754RR	118	29	38	34	40	32	39
KRUGER/ K-177RR	119	24	34	37	43	31	39
DAIRYLAND/ DSR1500RRSTS	113	28	35	32	41	30	38
PUBLIC/ SDX00R-026-42N	118	27	36	30	40	29	38
SODAK GENET./ SD1111RR	114	25	36	27	40	26	38
KRUGER/ K-156RR	117	26	36	29	38	28	37
PUBLIC/ SD01-3219R	118	25	34	30	39	28	37
THUNDER/ 2512RR	115	21	34	24	36	23	35
THOMPSON/ T-1766RR	114	32	.	39	.	36	.
KRUGER/ K-194RR	117	31	.	39	.	35	.
LATHAM/ EXP-E1950R	117	31	.	39	.	35	.
NUTECH/ NT-1127RR	117	29	.	39	.	34	.
WECO/ EXP 6 1.5RR	113	31	.	37	.	34	.
LATHAM/ L1553R	118	29	.	36	.	33	.
PRAIRIE BRAND/ PB-1916RR	116	29	.	36	.	33	.
WENSMAN/ W 2163RR	117	29	.	36	.	33	.
WENSMAN/ W 2108RR	117	25	.	41	.	33	.
PUBLIC/ SDX00R-017-52	115	30	.	36	.	33	.
PUBLIC/ SD02R-8	117	28	.	37	.	33	.
MUSTANG/ M-156RR	117	26	.	38	.	32	.
MUSTANG/ M-176RR	118	29	.	34	.	32	.
NUTECH/ NT-1991RR	117	29	.	34	.	32	.
G. COUNTRY SEED/ 8716R	119	28	.	35	.	32	.
THOMPSON/ T-1330RR	118	30	.	34	.	32	.
CROW'S/ C1106R	117	27	.	36	.	32	.
MUSTANG/ M-115RR	117	26	.	36	.	31	.
THUNDER/ 2511RR	117	26	.	36	.	31	.
THOMPSON/ T-1800RR	114	29	.	33	.	31	.
PUBLIC/ SDX00R-053-46	115	28	.	34	.	31	.
PUBLIC/ SD01-1120R	117	28	.	34	.	31	.
PUBLIC/ SD01-3477R	118	28	.	33	.	31	.
ASGROW/ AG1102	116	27	.	33	.	30	.
AGVENTURE/ AV14D6	118	27	.	32	.	30	.

Table 2a. Roundup Ready maturity group-I soybean variety yield averages (continued).

Brand/Variety (By 2-yr then 2006 zone yield)	DTM*	Yield Averages by Location				Northern Zone Averages	
		South Shore		Warner			
		Bu/Acre 2006	Bu/Acre 2-Yr	Bu/Acre 2006	Bu/Acre 2-Yr	Bu/Acre 2006	Bu/Acre 2-Yr
G. COUNTRY SEED/ 2713R	118	27	.	33	.	30	.
THOMPSON/ T-1414RR	117	26	.	33	.	30	.
THOMPSON/ T-1400RR	118	28	.	31	.	30	.
PUBLIC/ SDX00R-029-3	115	27	.	33	.	30	.
MUSTANG/ M-136RR	117	25	.	32	.	29	.
HEFTY/ EXP117RR	116	25	.	33	.	29	.
HEFTY/ EXP137RR	118	25	.	32	.	29	.
WECO/ EXP 6 1.0RR	116	26	.	32	.	29	.
PRAIRIE BRAND/ PB-1256RR	116	25	.	32	.	29	.
MIDWEST SEED/ GR1111	116	26	.	32	.	29	.
PUBLIC/ SD00-1018R	117	25	.	31	.	28	.
PUBLIC/ SD02R-93	117	24	.	32	.	28	.
KRUGER/ K-188RR/SCN	118	25	.	29	.	27	.
STINE/ 1108-4	116	25	.	28	.	27	.
KRUGER/ K-120RR	117	23	.	28	.	26	.
ASGROW/ AG1002	121	25	.	.	.	.	.
AGVENTURE/ AV11T1RR	122	27	39	.	.	.	.
AGVENTURE/ AVEXP10G9	111	.	.	27	.	.	.
AGVENTURE/ AV15D7	112	.	.	31	.	.	.
PSI BRAND/ 96110RR	123	26	38	.	.	.	.
G. COUNTRY SEED/6714NR	124	30	.	.	.	.	.
STINE/ 1918-4	.	28	39	.	.	.	.
ZILLER/ BT 7124R	121	27	.	.	.	.	.
NORTHSTAR/ NS 1120RR	123	30	38	.	.	.	.
Test avg. :	117	27	37	34	42	31	40
# Lsd (.05) :		4	NS	5	NS	3	.
## TPG-avg. :		28	34	24	36	33	.
@ Coef. Var. :		10	8	10	8	9	29+

* DTM= average days from seeding (South Shore- May 23, Warner- May 26, 2006) to maturity; a missing value indicates the site received a hard frost before the variety reached maturity.

Lsd,(.05)= amount values in a column must differ to be significantly different, if differences are not significant (NS), NS is indicated.

TPG-avg. = minimum value to qualify for top performance group.

@ Coef. Var.= a measure of trial experimental error, 15% or less is best.

+ Lsd and TPG-average values are not reported because Coef. of Variation exceeds 15%.

Table 2b. Roundup Ready maturity group-I soybean variety protein, oil, & lodging score averages- Northern locations, 2006.

Brand/Variety (By zone protein)	DTM*	Averages by Location						Northern Zone Averages		
		South Shore			Warner					
		Protein (%)	Oil (%)	Lodging (1-5)*	Protein (%)	Oil (%)	Lodging (1-5)*	Protein (%)	Oil (%)	Lodging (1-5)*
LATHAM/ L1553R	118	38.1	18.8	1	36.8	19.4	1	37.5	19.1	1
AGVENTURE/ AV14D6	118	37.7	18.6	1	37.0	19.0	1	37.4	18.8	1
MUSTANG/ M-156RR	117	38.1	18.6	1	36.5	19.6	1	37.3	19.1	1
HEFTY/ EXP137RR	118	38.0	18.8	1	36.4	19.5	1	37.2	19.2	1
KRUGER/ K-177RR	119	38.1	18.9	1	36.3	19.6	1	37.2	19.3	1
G. COUNTRY SEED/ 8716R	119	38.1	19.0	1	36.2	19.6	1	37.2	19.3	1
NUTECH/ NT-1404RR	117	37.5	18.7	1	36.7	19.4	1	37.1	19.1	1
NUTECH/ NT-7205+RR	117	37.5	18.9	1	36.7	19.3	1	37.1	19.1	1
DAIRYLAND/ DSR-1301/RR	118	37.5	18.9	1	36.7	19.6	1	37.1	19.3	1
PRAIRIE BRAND/PB-1754RR	118	37.1	18.5	1	37.1	19.1	1	37.1	18.8	1
MUSTANG/ M-176RR	118	37.4	18.6	1	36.8	19.2	1	37.1	18.9	1
THUNDER/ 2511RR	117	37.9	18.6	1	36.2	19.7	1	37.1	19.2	1
WENSMAN/ W 2163RR	117	37.0	18.6	1	37.0	19.2	1	37.0	18.9	1
DEKALB/ DKB18-51	113	37.6	18.8	1	36.3	19.5	1	37.0	19.2	1
STINE/ 1330-4	118	37.7	18.7	1	36.2	19.6	1	37.0	19.2	1
WECO/ EXP 6 1.5RR	113	37.2	19.0	1	36.6	19.3	1	36.9	19.2	1
KRUGER/ K-156RR	117	37.6	18.6	1	36.2	19.4	1	36.9	19.0	1
MIDWEST SEED/ GR1111	116	37.6	18.4	1	36.2	19.5	1	36.9	19.0	1
PUBLIC/ SD02R-93	117	37.4	18.8	1	36.4	19.7	1	36.9	19.3	1
MUSTANG/ M-136RR	117	37.7	18.5	1	35.9	19.5	1	36.8	19.0	1
KRUGER/ K-100RR	117	37.6	18.7	1	36.0	19.8	1	36.8	19.3	1
DAIRYLAND/DSR1500RRSTS	113	37.1	18.7	1	36.5	19.2	1	36.8	19.0	1
CROW'S/ C1106R	117	37.4	18.7	1	36.2	19.8	1	36.8	19.3	1
ASGROW/ AG1702	119	37.1	18.8	1	36.4	19.4	1	36.8	19.1	1
WECO/ EXP 6 1.0RR	116	37.3	18.8	1	36.2	19.7	1	36.8	19.3	1
G. COUNTRY SEED/ 2713R	118	37.4	18.9	1	36.1	19.7	1	36.8	19.3	1
THOMPSON/ T-1330RR	118	37.1	18.9	1	36.3	19.6	1	36.7	19.3	1
THOMPSON/ T-7234RR	115	36.7	19.1	1	36.6	19.5	1	36.7	19.3	1
THUNDER/ 2512RR	115	37.4	18.6	1	35.9	19.4	1	36.7	19.0	1
STINE/ 1108-4	116	37.1	19.0	1	36.0	19.7	1	36.6	19.4	1
THOMPSON/ T-1414RR	117	36.9	19.0	1	36.2	19.5	1	36.6	19.3	1
KRUGER/ K-188RR/SCN	118	37.3	18.7	1	35.7	19.8	1	36.5	19.3	1
KRUGER/ K-194RR	117	36.8	18.8	1	36.2	19.4	1	36.5	19.1	1
PRAIRIE BRAND/ PB-1525RR	118	36.9	18.9	1	36.1	19.6	1	36.5	19.3	1
THOMPSON/ T-1766RR	114	36.5	18.4	1	36.5	19.2	1	36.5	18.8	1
PRAIRIE BRAND/PB-1916RR	116	36.7	19.3	1	36.2	19.2	1	36.5	19.3	1
THOMPSON/ T-1400RR	118	36.6	18.9	1	36.3	19.4	1	36.5	19.2	1
WENSMAN/ W 2142RR	112	37.1	18.8	1	35.7	19.8	1	36.4	19.3	1
PRAIRIE BRAND/PB-1954RR	113	36.3	18.7	1	36.5	19.2	1	36.4	19.0	1
PUBLIC/ SD01-1120R	117	36.5	19.0	1	36.2	19.5	1	36.4	19.3	1
PUBLIC/ SDX00R-026-42N	118	36.8	18.6	1	35.9	19.3	1	36.4	19.0	1
PUBLIC/ SD01-3477R	118	36.8	18.7	1	35.9	19.6	1	36.4	19.2	1
HEFTY/ EXP117RR	116	36.4	19.1	1	36.2	19.6	1	36.3	19.4	1
KRUGER/ K-140RR	118	37.2	18.6	1	35.4	19.4	1	36.3	19.0	1
LATHAM/ EXP-E1950R	117	36.5	18.9	1	36.0	19.3	1	36.3	19.1	1
SEEDS 2000/ 2130RR	118	36.4	18.6	1	36.1	19.5	1	36.3	19.1	1
WENSMAN/ W 2108RR	117	36.6	19.0	1	35.8	19.8	1	36.2	19.4	1
PUBLIC/ SD02R-8	117	36.4	19.0	1	36.0	19.5	1	36.2	19.3	1
ASGROW/ AG1102	116	36.5	18.7	1	35.8	19.2	1	36.2	19.0	1
KRUGER/ K-120RR	117	36.9	18.5	1	35.4	19.4	1	36.2	19.0	1

Table 2b. Roundup Ready maturity group-I soybean variety protein, oil, and lodging score averages (cont.)

Brand/Variety (By zone protein)	DTM*	Averages by Location						Northern Zone Averages		
		South Shore			Warner					
		Protein (%)	Oil (%)	Lodging (1-5)*	Protein (%)	Oil (%)	Lodging (1-5)*	Protein (%)	Oil (%)	Lodging (1-5)*
THOMPSON/ T-1800RR	114	36.3	18.0	1	36.0	19.3	1	36.2	18.7	1
NUTECH/ NT-1127RR	117	36.7	18.8	1	35.4	19.4	1	36.1	19.1	1
NUTECH/ NT-1991RR	117	36.5	18.8	1	35.6	19.3	1	36.1	19.1	1
PRAIRIE BRAND/PB-1294RR	116	36.6	19.0	1	35.4	19.6	1	36.0	19.3	1
PRAIRIE BRAND/PB-1256RR	116	36.4	18.8	1	35.6	19.3	1	36.0	19.1	1
PUBLIC/ SD01-3219R	118	36.1	18.7	1	35.9	19.5	1	36.0	19.1	1
PUBLIC/ SDX00R-029-3	115	36.3	19.0	1	35.4	19.6	1	35.9	19.3	1
MUSTANG/ M-115RR	117	36.0	18.8	1	35.4	19.6	1	35.7	19.2	1
SODAK GENET./ SD1111RR	114	35.9	19.4	1	35.4	19.8	1	35.7	19.6	1
PUBLIC/ SDX00R-053-46	115	35.9	19.1	1	35.4	19.6	1	35.7	19.4	1
WENSMAN/ W 2121RR	115	35.8	19.0	1	35.1	19.7	1	35.5	19.4	1
PUBLIC/ SDX00R-017-52	115	35.9	19.0	1	35.0	19.7	1	35.5	19.4	1
PUBLIC/ SD00-1018R	117	35.9	19.2	1	34.7	20.0	1	35.3	19.6	1
ASGROW/ AG1002	121	36.7	19.0	1	.	.	.	.	.	.
AGVENTURE/ AV11T1RR	122	37.6	18.8	1	.	.	.	.	.	.
AGVENTURE/ AVEXP10G9	111	.	.	.	36.0	19.7	1	.	.	.
AGVENTURE/ AV15D7	112	.	.	.	36.3	19.7	1	.	.	.
PSI BRAND/ 96110RR	123	37.7	18.8	1	.	.	.	.	.	.
G. COUNTRY SEED/6714NR	124	36.9	18.9	1	.	.	.	.	.	.
STINE/ 1918-4	.	37.0	18.9	1	.	.	.	.	.	.
ZILLER/ BT 7124R	121	36.5	18.7	1	.	.	.	.	.	.
NORTHSTAR/ NS 1120RR	123	37.2	19.0	1	.	.	.	.	.	.
Test avg. :	117	37.0	18.8	1	36.1	19.5	1	36.5	19.1	1
# Lsd(.05) :		.	.	0	.	.	0	.	.	0
## TPG-avg. :		.	.	1	.	.	1	.	.	1
@ Coef.Var. :		.	.	0	.	.	0	.	.	0

* DTM= average days from seeding (South Shore- May 23, Warner- May 26, 2006) to maturity; a missing value indicates the site received a hard frost before the variety reached maturity.

** Lodging, 1= all plants erect, 5= all plant flat.

Lsd,(.05)= amount values in a column must differ to be significantly different, if differences are not significant (NS), NS is indicated.

TPG-avg. = minimum value to qualify for top performance group.

@ Coef. Var.= a measure of trial experimental error.

Table 3a. Non-Roundup Ready maturity group-0 and -I soybean variety yield averages- South Shore, SD, 2005-06.

Brand/Variety (By maturity group & 2006 yield)	DTM*	Averages by Maturity Group			
		MG-0		MG-I	
		Bu/Acre 2006	Bu/Acre 2-Yr	Bu/Acre 2006	Bu/Acre 2-Yr
PUBLIC/ SD03-1537	125	31	.	.	.
PUBLIC/ SD00-833	123	29	.	.	.
PUBLIC/ SD03-2327	121	27	.	.	.
PUBLIC/ HAMLIN	120	24	33	.	.
PUBLIC/ SURGE	120	23	33	.	.
PUBLIC/ SD02-829	124	22	33	.	.
RICHLAND ORGANICS/ 9532	113	21	.	.	.
PUBLIC/ SD00-895	124	21	.	.	.
PUBLIC/ SD03-2154	119	21	.	.	.
RICHLAND ORGANICS/ 9061	116	20	.	.	.
PUBLIC/ SD00-632	.	.	.	26	35
PUBLIC/ SD02-14	.	.	.	25	35
PUBLIC/ SD03-1899	.	.	.	25	.
PUBLIC/ SD02-1045	.	.	.	24	.
PUBLIC/ SD00-266	124	.	.	23	.
PUBLIC/ SD02-1138	123	.	.	23	.
PUBLIC/ SD03-1607	124	.	.	23	.
PUBLIC/ SD02-911	.	.	.	22	.
PUBLIC/ SD02-923	.	.	.	22	.
PUBLIC/ SD00-167	124	.	.	21	.
PUBLIC/ SD02-906	.	.	.	21	33
Test avg.:	121	24	33	23	34
# Lsd (.05):		3	NS	3	NS
## TPG-value:		28	33	23	33
@ Coef. Var.:		7	8	7	7

* DTM= average days from seeding on May 23, 2006 to maturity; a missing value indicates the site received a hard frost before the variety reached maturity.

Lsd,(.05)= amount values in a column must differ to be significantly different, if if differences are not significant (NS), NS is indicated.

TPG-avg. = minimum value to qualify for top performance group.

@ Coef. Var.= a measure of trial experimental error, 15% or less is best.

Table 3b. Non-Roundup Ready maturity group-0 and -I soybean variety protein, oil, and lodging score averages- South Shore, SD, 2006.

Brand/Variety (By maturity group & protein)	DTM*	2006 Averages by Maturity Group					
		MG-0			MG-I		
		Protein %	Oil %	Lodging* (1-5)	Protein %	Oil %	Lodging* (1-5)
RICHLAND ORGANICS/ 9061	116	39.3	17.1	1	.	.	.
PUBLIC/ HAMLIN	120	37.9	19.0	1	.	.	.
PUBLIC/ SURGE	120	37.7	19.0	1	.	.	.
PUBLIC/ SD00-895	124	37.3	18.8	1	.	.	.
PUBLIC/ SD00-833	123	37.0	18.9	1	.	.	.
PUBLIC/ SD02-829	124	37.0	19.0	1	.	.	.
PUBLIC/ SD03-1537	125	36.9	18.8	1	.	.	.
PUBLIC/ SD03-2327	121	36.8	19.0	1	.	.	.
PUBLIC/ SD03-2154	119	36.6	19.4	1	.	.	.
RICHLAND ORGANICS/ 9532	113	36.3	19.5	1	.	.	.
PUBLIC/ SD00-632	.	.	.	.	37.3	18.6	1
PUBLIC/ SD00-167	124	.	.	.	37.0	19.0	1
PUBLIC/ SD02-14	.	.	.	.	36.6	19.0	1
PUBLIC/ SD00-266	124	.	.	.	36.4	19.0	1
PUBLIC/ SD03-1607	124	.	.	.	36.4	19.1	1
PUBLIC/ SD02-906	.	.	.	.	36.3	19.3	1
PUBLIC/ SD02-911	.	.	.	.	36.3	19.1	1
PUBLIC/ SD02-1045	.	.	.	.	36.3	19.0	1
PUBLIC/ SD02-923	.	.	.	.	36.1	19.0	1
PUBLIC/ SD03-1899	.	.	.	.	35.8	19.0	1
PUBLIC/ SD02-1138	123	.	.	.	35.3	19.4	1
Test avg. :	121	37.3	18.9	1	36.3	19.0	1
* Lsd(.05) :		.	.	0	.	.	0
## TPG-avg. :		.	.	1	.	.	1
@ Coef. Var. :		.	.	0	.	.	0

* DTM= average days from seeding on May 25, 2006 to maturity; a missing value indicates the site received a hard frost before the variety reached maturity.

** Lodging, 1= all plants erect, 5= all plant flat.

Lsd,(.05)= amount values in a column must differ to be significantly different, if differences are not significant (NS), NS is indicated.

TPG-avg. = minimum value to qualify for top performance group.

@ Coef. Var.= a measure of trial experimental error.

2006 Precision-Planted Corn Performance Trials

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General Test Procedures: Entries were seeded in three replications with each replicate randomly located within each trial. Plots consisted of four 30-inch rows and measuring 20 feet long. A Monosem precision row crop planter was used for seeding plots. In 2006, this precision planter was calibrated and delivered 27,878 seeds per acre, regardless, of seed quality and germination percentage. No seeding rate adjustment was made for low germination. Therefore, percent stand is an indication of initial seed quality and the ability of the seed to cope with the production environment. Seedbed preparation was good at planting. A starter fertilizer of 100 pounds/acre of 37-18-00 was applied 2" below and 2" to the side (2 x 2) of the seed row. Force insecticide was applied in-furrow at label rates for corn rootworm control. Weed control the non-Roundup Ready™ plots consisted of a pre application of Harness at label rates and a post single light cultivation. In the Roundup Ready™ hybrid corn trials weed control included a pre Harness application and one post application of Roundup™ at label rates. The center two rows of each 4-row plot were harvested with a Massey Ferguson 8XP small plot combine.

Yield**.** Yields are an average of three replications, and are expressed as bushels per acre, adjusted to 15.5% moisture on a dry-matter basis and a bushel weight of 56 pounds. In 2006, the CV values (a measure of experimental error) were quite high in both the Non-Roundup Ready™ and Roundup Ready ™ test trials. Ideally, this value should not exceed 20%. When the CV value exceeds 20% it is recommended that the test data be used with caution in making hybrid selection decisions. In 2006, the exceptionally high CV values, indicates there was too much error associated with the test trials to make any determination of which hybrids should be in the top performance group for yield. It makes it impossible to determine if any two hybrids that are relatively close in yield are actually similar or different in yield. The high level of experimental error was likely the result of two main factors: (1) the seasonal moisture distribution and/or lack of subsoil moisture and (2) the occurrence of elevated high temperatures from silking to pollination that resulted in poor ear and/or kernel development. In many plots only a "nubbin" was formed. Within a hybrid, not all plots showed a lack of pollination. In a few hybrids, all the replicates appeared normal, whereas, in other hybrids, one or more of their plots showed a lack of pollination. Hybrids with high averages pollinated normally, while plots with the lower yield averages experienced moderate to severe problems with pollination and/or ear development. South Shore was exposed to above normal temperatures in July. Air temperatures of 95 ^{o}F or higher can have a profound and negative effect on corn pollination.

Grain moisture content: Moisture content is expressed as the percentage of moisture in the shelled corn at harvest. During harvest, random moisture values was determined by the on-board moisture meter on the combine and checked with a Dickey-John GAC II to verify that the on-board moisture meter was within calibration limits.

Performance Trial Results - for two years (2005-06) and one year (2006)

Note: The CV values for yield were higher than 20% and were too high to be considered as valid or acceptable. See previous discussion in Yield section.

Early - Non-Roundup Ready™ hybrids, Table 1a. The test trial yield average was 54 bu/A in 2006 and 114 bu/A for two years. There was no significant difference in yield average among the entries tested for two years so six entries qualified for the top yield group. The high level of experimental error (CV =45%) prevented the valid determination of the top performance group for yield and the determination of hybrid yield differences between the entries tested in 2006. In 2006, bushel weights averaged 57 lbs, grain moisture averaged 17%, lodging averaged 1% and the final percent stand averaged 100%. In order for a hybrid to be in the top performance group for these factors they had to equal 57 lbs. or more in bushel weight, 18% or less in grain moisture, 2% or less in stalk lodging, and 98% or more for percent stand.

Late - Non-Roundup Ready™ hybrids, Table 1b. The test trial yield average was 40 bu/A in year 2006 and 86 bu/A for two years. There was no significant difference in yield average among the hybrids tested for two years so both entries qualified for the top yield group. The high level of experimental error (CV =58%) prevented the valid determination of the top performance group for yield and the determination of hybrid yield differences between the entries tested in 2006. In 2006, bushel weights averaged 55 lbs, grain moisture averaged 20%, lodging averaged 0% and the final percent stand averaged 99%. In order for a hybrid to be in the top performance group for these factors they had to equal 56 lbs. or more in bushel weight, 18% or less in grain moisture, 2% or less in stalk lodging, and 98% or more for percent stand.

Early - Roundup Ready™ hybrids, Table 2a. The test trial yield average was 70 bu/A in 2006 and 129 bu/A for two years. There was no significant difference in yield average among the hybrids tested for two years so all 14 entries qualified for the top yield group. The high level of experimental error (CV =30%) prevented the valid determination of the top performance group for yield and the determination of hybrid yield differences between the entries tested in 2006. In 2006, bushel weights averaged 56 lbs, grain moisture averaged 17%, lodging averaged 1% and the final percent stand averaged 98%. In order for a hybrid to be in the top performance group for these factors they had to equal 57 lbs. or more in bushel weight, 16% or less in grain moisture, 2% or less in stalk lodging, and 98% or more for percent stand.

Late - Roundup Ready™ hybrids, Table 2b. The test trial yield average was 77 bu/A in 2006 and 127 bu/A for two years. There was no significant difference in yield average among the hybrids tested for two years so all eight entries qualified for the top yield group. The high level of experimental error (CV =39%) prevented the valid determination of the top performance group for yield and the determination of hybrid yield differences between the entries tested in 2006. In 2006, bushel weights averaged 55 lbs, grain moisture averaged 19%, lodging averaged 1% and the final percent stand averaged 99%. In order for a hybrid to be in the top performance group for these factors they had to equal 57 lbs. or more in bushel weight, 17% or less in grain moisture, 3% or less in stalk lodging, and 95% or more for percent stand.

Table 1a. Early maturity Non-Roundup Ready corn hybrid test trial results, 2005-06.

Brand/Hybrid (By 2-year then '06 yields)	Brand Rel. Mat.	Hybrid performance variable at harvest					
		2-yr Yield bu/a	'06 Yield bu/a	'06 BuWt lb	'06 Grain Moist %	'06 Lodging %	'06 Pct.* Stand
TWO-YEAR ENTRIES:							
WENSMAN/ W 5212BT	95	119	75	57	16	0	99
DAIRYLAND/STEALTH-5194	94	118	77	57	17	1	100
GOLD COUNTRY/ 94-01CB	94	115	67	56	18	2	100
KRUGER/ 9496YGCB	95	113	61	57	16	1	99
KRUGER/ EXP0692	92	109	60	59	15	1	99
SEEDS 2000/ 2953BT	95	108	51	56	18	0	98
ONE-YEAR ENTRIES:							
KRUGER/ EXP5593BTLL	93	.	72	58	16	0	100
WENSMAN/ W4190	90	.	71	56	14	1	100
KRUGER/ EXP5693YGCB	93	.	55	56	16	1	99
KRUGER/ EXP5494BTLL	94	.	45	55	17	1	100
KRUGER/ EXP0191	91	.	39	57	19	1	100
KRUGER/ EXP5596BTLL	95	.	34	58	18	0	100
KRUGER/ EXP0192	92	.	29	53	17	0	100
GOLD COUNTRY/ 95-03CB	95	.	21	.	17	1	100
Trial avg.:	93	114	54	57	17	1	100
** Lsd (.05):		NS	++	2	-	-	NS
# Min. TPG-value:		108	-	57	-	-	98
## Max. TPG-value:		-	-	-	18	2	
+ Coef. of var.:		18	45+++	2	9	171	1

* Seeded May 5, 2006 at 28,750 seeds per acre.

** Lsd= the amount values in a column must differ to be significantly different.

If Lsd = NS then differences among values in a column are non-significant (NS).

Min. TPG-value= minimum value required for the top performance group.

Max. TPG-value= maximum value required for the top performance group.

+ Coef. of Variation = a measure of trial experimental error, 20% or less is best for yield.

++ Lsd value is not reported because Coef. of Variation value exceeds 20%.

+++ The high level of experimental error in this test indicates caution should be exercised when using this data to determine the top performance group for yield or for determining if two hybrids differ in yield.

Table 1b. Late maturity Non-Roundup Ready corn hybrid test trial results, 2005-06.

Brand/Hybrid (By 2-year then '06 yields)	Brand Rel. Mat.	Hybrid performance variable at harvest					
		2-yr Yield bu/a	'06 Yield bu/a	'06 BuWt lb	'06 Grain Moist %	06 Lodging %	'06 Pct.* Stand
TWO-YEAR ENTRIES:							
KRUGER/ 5504YGCB	103	86	13	.	18	0	100
KRUGER/ 8602HX	102	86	10	.	18	1	98
ONE-YEAR ENTRIES:							
RENK/ RK488YGCB	97	.	97	57	17	0	100
RENK/ RK575YGPL	97	.	82	54	16	0	100
KRUGER/ EXP5597BTLL	97	.	70	58	19	1	100
KRUGER/ EXP5497YGCB	97	.	63	54	17	0	100
KALTENBERG/ K4688BT	96	.	50	57	17	3	99
KRUGER/ 0603	103	.	29	54	22	0	99
KRUGER/ EXP8601HX	101	.	26	54	24	0	100
AGVENTURE/ AV5544CB	98	.	25	55	22	1	96
KRUGER/ EXP5498YGCB	98	.	23	51	26	0	99
KRUGER/ EXP0599	99	.	16	.	19	0	100
KRUGER/ EXP8502HX	102	.	10	57	20	0	99
Trial avg.:	99	86	40	55	20	0	99
** Lsd (.05):		NS	++	3	2	2	2
# Min. TPG-value:		86	-	56	-	-	98
## Max. TPG-value:		-	-	-	18	2	-
+ Coef. of var.:		10	58+++	3	6	240	1

* Seeded May 5, 2006 at 28,750 seeds per acre.

** Lsd= the amount values in a column must differ to be significantly different.

If Lsd = NS then differences among values in a column are non-significant (NS).

Min. TPG-value= minimum value required for the top performance group.

Max. TPG-value= maximum value required for the top performance group.

+ Coef. of Variation = a measure of trial experimental error, 20% or less is best for yield.

++ Lsd value is not reported because Coef. of Variation value exceeds 20%.

+++ The high level of experimental error in this test indicates caution should be exercised when using this data to determine the top performance group for yield or for determining if two hybrids differ in yield.

Table 2a. Early maturity Roundup Ready corn hybrid test trial results, 2005-06.

Brand/Hybrid (By 2-year then '06 yields)	Brand Rel. Mat.	Test trial variable at harvest					
		2-yr Yield bu/a	'06 Yield bu/a	'06 BuWt lb	'06 Grain Moist %	'06 Lodging %	'06 Pct.* Stand
TWO-YEAR ENTRIES:							
INTEGRA/INT 63F90RRYG	91	139	85	58	17	0	98
DEKALB/DKC42-95RR2YGCB	92	138	91	56	17	0	98
WENSMAN/W 6194BTRR	95	134	92	57	16	0	100
KRUGER/9496RR	95	133	80	56	15	0	100
KRUGER/9593RR/YGCB	93	132	81	60	15	0	100
WENSMAN/W 6117BTRR	92	131	79	57	17	0	99
SEEDS 2000/2953RR	95	131	76	57	17	0	98
INTEGRA/INT 6395RR	94	131	74	55	18	2	99
SEEDS 2000/2944RR/BT	94	126	81	58	16	0	96
KRUGER/9392RR/YGCB	92	126	66	57	17	0	100
KALTENBERG/K3919RRBT	92	124	74	57	18	0	100
DEKALB/DKC41-64RR2YGCB	91	124	62	53	23	3	99
WENSMAN/W 6212RR	95	123	64	55	16	0	96
AGVENTURE/AV4883R2RW	94	108	44	56	18	1	96
ONE-YEAR ENTRIES:							
CROWS/ 1699T	94	.	95	55	17	0	98
WENSMAN/ W 7118BTRWRR	92	.	88	57	16	0	99
AGVENTURE/ AV4006YPRR	92	.	84	58	16	0	100
GOLD COUNTRY/ 92-01CBRC	92	.	83	58	18	0	97
NUTECH/ 9197 RR/YGPL	95	.	82	58	18	0	99
KRUGER/ 9392TS	92	.	82	56	17	1	98
MIDWEST/ 69402T	94	.	82	54	19	1	99
KRUGER/ 1195RR	95	.	78	56	17	0	100
LEGEND/ LR9391RRYG+	91	.	77	55	18	2	100
WILBUR ELLIS/ HB9421R	92	.	74	57	18	1	99
GOLD COUNTRY/ 93-04CBR	93	.	74	55	20	1	98
NUTECH/ 5596 RR/YGCB	95	.	73	56	21	0	97
DEKALB/ DKC44-92 (RR2)	94	.	71	56	17	0	97
KRUGER/ EXP1190RR	90	.	69	57	14	0	100
NUTECH/ 3995 RR	94	.	68	56	18	1	100
LEGEND/ LR9594RB	94	.	67	56	17	1	97
AGVENTURE/ AV5016R2CB	94	.	62	56	17	6	99
EPLEY/ E1165RR	95	.	60	55	17	1	98
WILBUR ELLIS/ HB9451R	95	.	53	56	18	1	95
KRUGER/ 1587RR	87	.	52	59	14	0	99
KALTENBERG/ K2405RRBT	81	.	44	57	14	0	98
KRUGER/ EXP1292RR	92	.	36	52	16	0	100
KRUGER/ EXP2688RR/YGCB	88	.	31	55	18	1	100
KRUGER/ 2288RR/YGCB	88	.	28	55	20	0	98
Trial avg.:	92	129	70	56	17	1	98
** Lsd (.05):		NS	++	3	2	2	NS
# Min. TPG-value:		108	-	57	-	-	98
## Max. TPG-value:		-	-	-	16	2	-
+ Coef. of var.:		13	30+++	3	8	209	2

* Seeded May 5, 2006 at 28,750 seeds per acre. ** Lsd= the amount values in a column must differ to be significantly different. If Lsd = NS then differences among values in a column are non-significant (NS).
# Min. TPG-value= minimum value required for the top performance group. ## Max. TPG-value= maximum value required for the top performance group.
+ Coef. of Variation = a measure of trial experimental error, 20% or less is best for yield. ++ Lsd value is not reported because Coef. of Variation value exceeds 20%.
+++ The high level of experimental error indicates caution should be exercised when using this data to determine the top performance group for yield or for determining if two hybrids differ in yield.

Table 2b. Late maturity Roundup Ready corn hybrid test trial results, 2005-06.

Brand/Hybrid (By 2-year then '06 yields)	Brand Rel. Mat.	Test trial variable at harvest					
		2-yr Yield bu/a	'06 Yield bu/a	'06 BuWt lb	'06 Grain Moist %	'06 Lodging %	'06 Pct.* Stand
TWO-YEAR ENTRIES:							
KRUGER/2697RR/YGCB	97	142	105	55	17	1	99
DEKALB/DKC50-20RR2YGCB	100	141	98	56	18	0	100
WENSMAN/W 6266BTRR	97	137	91	57	17	0	100
DEKALB/DKC48-53RR2YGCB	98	130	81	53	17	2	98
KRUGER/ 1500RR	100	130	81	56	16	1	99
NUTECH/NT-5101 RR/YGCB	101	123	65	51	23	2	100
DAIRYLAND/STEALTH-6497	97	121	67	56	14	2	100
KRUGER/6503TS	103	111	62	55	21	0	100
KRUGER/9203RR/YGCB	103	109	41	50	24	0	99
ONE-YEAR ENTRIES:							
MIDWEST/ 69642S	96	.	108	56	16	0	98
DAIRYLAND/ STEALTH-7196	96	.	106	56	16	2	97
DEKALB/ DKC46-22RR2YGPL	96	.	101	59	16	0	97
WENSMAN/ W 6307RR	100	.	101	55	19	2	99
WENSMAN/ W 7269BTRWRR	97	.	101	54	16	0	99
SEEDS 2000/ EXP3101RR	101	.	100	57	17	0	96
CROWS/ 1705S	96	.	97	56	18	1	98
KRUGER/ EXP1700RR	100	.	96	56	16	1	99
KRUGER/ EXP1503RR	103	.	95	53	20	1	97
NUTECH/ 5696 RR/YGCB	96	.	94	55	15	1	99
MIDWEST/ 4S502	97	.	92	58	17	0	99
PANNAR/ 5C-760RRCRW+	97	.	89	54	16	0	97
NUTECH/ 7099 RR/YGRW	98	.	88	58	18	0	95
CROWS/ 4S502	97	.	88	57	16	0	100
KRUGER/ 2499RR/YGCB	99	.	87	57	17	0	98
EPLEY/ E1185RR	97	.	86	55	15	2	98
WENSMAN/ W 6287RR	98	.	84	56	17	1	99
INTEGRA/ INT 6698RRYG	97	.	84	55	16	2	98
EPLEY/ E1195RR	98	.	79	58	17	0	99
LEGEND/ LR9396RRCR	96	.	78	56	16	3	100
WILBUR ELLIS/ HB9482RB	98	.	76	53	17	0	99
GOLD COUNTRY/ 98-10CBR	98	.	73	56	18	0	97
EPLEY/ E12R24YGPL	100	.	69	53	22	0	100
DAIRYLAND/ STEALTH-7201	100	.	66	55	22	0	99
NUTECH/ 9002 RR/YGPL	100	.	62	54	25	1	99
RENK/ RK488RRYGPL	97	.	61	58	18	1	99
NUTECH/ 3301 RR	100	.	60	50	22	0	97
INTEGRA/ INT 6602RRYG	100	.	59	52	22	0	99
NUTECH/ 9101 RR/YGPL	100	.	58	53	23	1	99
EPLEY/ E12R45YGCB	102	.	58	50	24	0	98

Table 2b. Late maturity Roundup Ready corn hybrid test trial results, 2005-06.

Brand/Hybrid (By 2-year then '06 yields)	Brand Rel. Mat.	Test trial variable at harvest					
		2-yr Yield bu/a	'06 Yield bu/a	'06 BuWt lb	'06 Grain Moist %	'06 Lodging %	'06 Pct.* Stand
PANNAR/ 5E-900RRBT	97	.	56	51	25	0	99
KRUGER/ 1603RR	103	.	54	56	20	0	99
KRUGER/ EXP2301RR/YGCB	103	.	48	50	27	1	100
KRUGER/ 6603TS	103	.	39	50	26	1	100
PANNAR/ 5E-850RRBT	96	.	34	54	25	1	99
EPLEY/ E1445RR	104	.	29	55	22	0	100
Trial avg.:	99	127	77	55	19	1	99
** Lsd (.05):		NS	++	2	3	NS	NS
# Min. TPG-value:		109	-	57	-	-	95
## Max. TPG-value:		-	-	-	17	3	-
+ Coef. of var.:		18	39+++	2	9	201	2

* Seeded May 5, 2006 at 28,750 seeds per acre.

** Lsd= the amount values in a column must differ to be significantly different.

If Lsd = NS then differences among values in a column are non-significant (NS).

Min. TPG-value= minimum value required for the top performance group.

Max. TPG-value= maximum value required for the top performance group.

+ Coef. of Variation = a measure of trial experimental error, 20% or less is best for yield.

++ Lsd value is not reported because Coef. of Variation value exceeds 20%.

+++ The high level of experimental error indicates caution should be exercised when using this data to determine the top performance group for yield or for determining if two hybrids differ in yield.

2006 Flax Variety Trials

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A yield trial of flax varieties and experimental lines from South Dakota, North Dakota, and Canada was grown at the Northeast Research Station (Watertown, SD) and Brookings, SD in 2006. The purpose of the trial was to provide performance data on released flax varieties to producers and compare performance of experimental lines to established checks in order to identify possible new varieties. Data from the South Dakota trials are also included in the flax regional trial report, which summarizes the performance of experimental lines across the flax growing regions of SD, ND, and Canada.

In 2006, ten experimental lines from the NDSU or Canadian flax breeding programs were tested against twenty released varieties. The Watertown trial was planted on April 27, 2006. Brookings early-seeded was planted April 26th, and Brookings Late was planted May 23, 2006. An additional trial was planted at Brookings on May 23rd in a field infested with the flax wilt fungus, *Fusarium oxysporum* f. *lini*, in order to test the resistance of the flax varieties to wilt.

Experiment design at each location was a randomized complete block with three replications. Plots consisted of seven rows 14 ft. long, with rows spaced seven inches apart. Plots at all locations were harvested by cutting the middle three rows of each plot with a bundle cutter, then drying and threshing the bundles.

The 2006 growing season began warmer and slightly dryer than normal in most of eastern South Dakota. Topsoil moisture was adequate at planting at all locations. Stands were good at all locations.

Seed yield and agronomic data on the 30 varieties tested are presented in Table 1. Yield averaged over varieties was highest at Watertown (20.8 bu/A) and lowest at the late-seeded Brookings location (9.9 bu/A). Averaged over all three tests, Carter was the highest yielding variety in 2006.

This research was funded by the SDSU Agricultural Experiment Station and the SDSU Plant Science Department Oilseed project.

Table 1. Summary of results of the 2006 flax Regional variety performance trial.

Variety	Origin -Year	Seed Yield (bu/A) Bks Early	Bks Late	Wtn	Mean	Rank	% of Checks	Oil %	Height (in.)	Bks Wilt (1-9)*
					-3-			-3-	-3-	
AC Carnduff	CAN-99	**16.0**	**10.5**	18.2	**15.0**	25	95	40.2	19	4.0
AC Hanley	CAN-02	**15.3**	7.5	16.5	**13.3**	30	83	37.9	18	4.4
AC Watson	CAN-97	**18.0**	10.4	**22.0**	**16.9**	6	106	40.3	18	4.7
Bison (check)	ND-27	**20.0**	9.4	19.2	**16.3**	12	103	37.7	19	8.7
Carter	ND-05	**17.5**	**11.2**	**25.1**	**18.1**	1	114	39.4	19	2.9
Cathay	ND-97	**17.3**	9.8	17.3	**14.9**	26	94	40.4	19	6.9
CDC Arras	CAN-00	**14.5**	**10.5**	**25.0**	**16.8**	7	106	40.1	19	8.0
CDC Bethume	CAN-00	**15.8**	10.2	**22.9**	**16.4**	11	103	39.5	19	2.9
CDC Mons	CAN-03	**17.4**	9.0	**21.2**	**16.0**	15	101	39.4	18	3.0
CDC Normandy	CAN-96	**19.0**	**11.6**	20.9	**17.3**	2	109	39.4	19	3.4
Linott (check)	CAN-66	**18.0**	**10.6**	20.2	**16.4**	10	103	40.0	19	5.7
McGregor (check)	CAN-82	**18.1**	8.3	18.7	**15.1**	24	95	38.1	18	2.5
Nekoma	ND-02	**17.5**	**12.7**	20.2	**17.0**	5	107	40.4	19	2.1
Omega	ND-90	**17.8**	8.7	**24.7**	**17.2**	3	108	39.9	18	7.0
Pembina	ND-97	**13.7**	9.4	20.6	**14.7**	27	93	40.0	19	7.3
Prairie Blue	CAN-03	**16.4**	8.8	**22.3**	**16.0**	17	100	40.6	18	2.5
Rahab 94 (check)	SD-94	**13.9**	10.2	**22.8**	**15.7**	20	99	40.1	17	7.0
Selby	SD-00	**17.9**	9.8	**23.4**	**17.1**	4	108	40.8	18	4.1
Webster	SD-98	**15.5**	**11.7**	20.3	**16.0**	14	101	39.9	19	2.7
York	ND-02	**17.4**	10.1	**22.3**	**16.8**	8	105	38.9	17	4.6
FP2112	CAN-exp.	**15.1**	8.9	**21.7**	**15.3**	23	96	40.9	19	3.3
FP2114	CAN-exp.	**16.1**	8.8	18.2	**14.5**	28	91	39.9	18	3.3
FP2118	CAN-exp.	**17.3**	7.0	18.7	**14.5**	29	91	40.4	19	4.0
FP2119	CAN-exp.	**19.5**	8.8	18.6	**15.8**	19	99	40.6	18	2.5
FP2137	CAN-exp.	**16.3**	**11.0**	**21.2**	**16.3**	13	103	39.1	18	4.0
N2010B	ND-exp.	**14.2**	**11.8**	20.5	**15.6**	21	98	39.9	18	2.2
N325	ND-exp.	**16.0**	9.4	**22.1**	**16.0**	16	101	39.5	18	2.0
N414	ND-exp.	**18.5**	**10.5**	20.3	**16.6**	9	104	39.6	19	--
TS 12	ND-exp.	**16.1**	10.2	20.8	**15.8**	18	99	39.2	19	--
TS 19	ND-exp.	**17.3**	9.2	19.4	**15.4**	22	97	38.2	20	--
Grand Mean		16.8	9.9	20.8	16.0			39.7	18	4.3
Check Mean		17.5	9.6	20.2	15.9			39.0	18	6.0
LSD.05		NS	2.2	4.1	NS			1.5	NS	1.6
Minimum yield of top group		NS	10.5	21.0	NS					
C.V.		13.0	13.3	12.1	13.5			2.3		22.0

Bks Early (Brookings Early) planted April 26, 2006.

Wtn (Watertown) planted April 27, 2006.

Bks Late (Brookings Late) and Bks Wilt planted May 23, 2006.

* Wilt was rated on a scale of 1 to 9, where 1=best and 9=worst.

OAT PROJECT

Lon Hall

My objective is to develop oat varieties for producers in South Dakota and surrounding states. Multipurpose varieties are being developed to satisfy more than one market. These varieties may be used in double cropping, as a companion crop, forage, and/or harvested for grain. The desired agronomic traits are a high grain and/or forage yield potential, high-test weight, disease resistance, straw strength, and maturity adaptation for different regional environments. Desired seed traits for hulled oats include a white hull, high groat percentage, and large seeds; the hulless seed traits include a light color seed, few trichomes (hairless), and large seed. The quality traits desired by the millers are low oil, high protein, and beta-glucan grain. The horse feed community want a white hull and high protein grain, and the livestock feeders want high Relative Feed Value forage, high oil, and high protein grain.

Parents in the crossing block were selected for specific traits. The desired combination of traits cannot always be acquired in two-way crosses; therefore, some combinations were made specifically for three-way crosses. The 2006 spring crossing block yielded 321 successful unique genetic combinations. Two hundred and fifty one of these were selected for F1 increase in the fall greenhouse cycle. Fifteen crosses were selected, based on pedigree, for single seed descent generation advancement. These crosses theoretically possess exceptional gene combinations, hence, the effort to advance three generations a year. There were a total of 4432 yield plots grown in the field. The numbers of unique bulk populations grown were 192 bulk F2s and 96 bulk F3s. There were 2016 lines derived from F5, F7, F8, and/or F9 generations grown in unreplicated Preliminary Yield Trials (PYT) at the Northeast Farm or the Brookings location. The number of unique lines grown in replicated Advanced Yield Trials (AYT) and regional nurseries were 304 and 120 respectively. Forty five preliminary seed increases were grown at the Brookings or Northeast Farm locations. Twenty thousand plants consisting of 87 populations and three backcrosses consisting of 144 single backcross single seed descent subpopulations were screened for kernel type and crown rust in the fall greenhouse cycle. Approximately 6,000 selected single seed descent seeds will be planted in the spring greenhouse cycle. They will be inoculated with crown rust, and the susceptible plants will be discarded. Two thousand and forty single seed descent plants, as well as 384 single plant increases in the fall greenhouse cycle will be yield tested in 2007 PYT.

Stallion', a white hulled spring oat, was developed by the South Dakota Agricultural Experiment Station (SDAES) and released in 2006. Stallion was tested as experimental line SD000366-36. SD89507/Settler//SD93068 is the three-parent pedigree. The complete pedigree is Settler/4/Nodaway70 /Dal//MN73231/3/Dumont/5/Settler/6/ND750432/Moore//Il75-3402/4/MN72-3/72-29//Dal/Nodaway70/3/Spear/Kelsey//Nodaway70/MN72-3. Stallion, when compared to 'Jerry', has superior grain yield, test weight, groat percentage, and crown rust resistance. Stem rust, Barley Yellow Dwarf Virus, and smut resistance are similar to Jerry's and on average Stallion is 1.4 inches taller and heads 3.4 days later.

SD020301-20 and SD030883's derivatives have undergone a preliminary increase and are the two most advanced lines. SD030301-20, a hulless line, has excellent forage quality and agronomic traits. This line is a muliti-purpose oat that may be harvested for forage, straw, and/or grain. SD020883's very early maturity makes it an option for double cropping, companion crop, or

harvested for grain. SD020883-29, SD020883-109, SD020883-171, and SD030883-187 are derivatives out of SD020883. Upon approval, one of the SD020883 siblings and SD030301-20 will be scheduled for release in 2009.

In the following tables the highlighted lines are the most advanced and are currently being purified. South Dakota's most recent releases 'Buff', 'Reeves', and Stallion are also high lighted for comparison. The lines selected for purification possess disease resistance in addition to superior agronomic traits.

South Dakota Standard Variety Oat Trials

	2005 yld bu/a 7lo c	2006yld bu/a 7loc	2006 tw lbs/bu 7loc	2006 mat. head days relat.to Don	2006 ht inches 7loc	2006 protein percent 7loc
SD 011315-15	106	106	37	8	32	15.5
SD 030324		106	36	5	34	16.3
Souris		104	37	6	29	15.9
SD 021021	108	101	36	4	30	17.6
SD 020701	106	101	37	4	33	16.5
SD 030888		101	38	4	27	15.9
HiFi	102	100	36	8	33	15.6
SD 020536	102	100	38	8	30	16.2
Stallion	98	100	39	8	34	17.2
Baker		98	35	4	32	15.9
Beach	95	97	39	6	34	15.5
Morton	96	94	37	7	34	16.5
Loyal	95	94	38	8	34	17.8
SD 031128		91	37	2	32	16.3
Maida		88	36	7	34	17.4
Jerry	96	80	37	5	32	16.6
SD 020883	104	79*	38	-1	31	17.2
Don	97	79	36	1	28	15.6
Reeves	90	74	36	2	33	16.1
Hytest	77	73	39	4	36	19.5
GG-304		69	30	8	21	16.1
Buff, Hls	73	64	44	3	29	18.2
Paul, Hls	62	63	42	9	33	18.2
Stark, Hls	63	54	40	9	34	17.8
mean	92	88	37	5	32	17

*severe bird damage at Warner, considerable damage at Brookings and possibly other locations caused a significant yield loss. Birds select the first lines to reach the milk stage.

BROOKINGS FORAGE TRIAL AND HULLESS AYT
(focus on the AYT)

Cultivar	Dry Matter tons/a Yield	CP %	NDF %	ADF %	RFV %
Everleaf 126	4.36	11.5	48.2	28.3	133
AC Pinnacle	4.27	10.8	59.2	32.9	103
Loyal	4.22	9.8	62.9	37.4	91
Everleaf 114	4.21	11.9	52.3	30.6	119
SD-030301(hulless)	4.11	10	59.7	34.9	100
Stallion	4.1	10	60.2	34.6	99
SD-127	3.92		58.9	34.3	102
Paul	3.88	10.8	57.8	33.2	104
Morton	3.87	10.6	59.8	34.6	100
Magnum	3.68	10.4	61.3	36	95
Jerry	3.19	10.2	60.1	33.5	101
Buff (hulless)	3.11	11	57.3	32.1	107
Stark (hulless)	2.8	11.8	53.7	30	117
LSD (5%)	*0.38*	*1*	*2.7*	*1.7*	*6.7*
CV, %	*6.98*	*4.1*	*2.8*	*3*	*3.8*
ADVANCED YIELD TRIALS	Dry Matter tons/a Yield	CP % 3loc	NDF % 3loc	ADF % 3loc	RFV % 3loc
SD020301-20 (hulless)	NA	12	54	33	114
BUFF (hulless)	NA	13	58	33	106
AYT Grain and Plant Traits	Yield bu/a 4loc	Protein % 3loc	TW lbs/bu 4loc	Snap O-5 4loc	CR % lloc
SD020301-20 (hulless)	70	21.0	46	3	9
BUFF (hulless)	66	18.6	44	2	73

CP=Crude protein
ADF=Acid detergent fiber, lower number is better
NDF=Neutral detergent fiber, lower number is better
RFD=Relative Feed Value, higher number is better

Winter Wheat Breeding and Genetics

Amir Ibrahim, Steve Kalsbeck, Rich Little

Summary of Activities

The Winter Wheat Breeding and Genetics Program utilizes the Northeast Research Station primarily to conduct winterhardiness evaluations and for the state Crop Performance Testing (CPT) Variety Trial. The breeding program also conducts field-testing at several other sites throughout South Dakota (Brookings, Highmore, Selby, Winner, Wall, and the Dakota Lakes Research Station near Pierre), for both early-generation selection and determination of the potential of experimental lines for cultivar release.

Testing conducted at the Northeast Research Station during 2006 included:

i) The CPT Variety Trial, under the overall coordination of Dr. Bob Hall. The trial included 30 entries, consisting of 18 released varieties (including new releases from other states), 10 advanced experimental lines from our program, and one experimental line each from Nebraska public breeding program and AgriPro. This trial was also grown at 13 other sites in South Dakota. Prior to cultivar release, promising elite lines must be grown in the CPT Variety Trial for three years to accurately measure the potential performance across a range of environmental conditions.

ii) A speciality winter wheat trial, including soft and hard winter wheat lines.

iii) A cold tolerance trial consisting of lines of variable freeze survival ability.

iv) A two-row winterhardiness nursery, consisting of short-row evaluations of several different breeding nurseries: the Regional Germplasm Observation Nursery (RGON, 290 entries); Nebraska Interstate Nursery (NIN, 60 entries); South Dakota Advanced Yield Trial (45 entries); Colorado Interstate Nursery (50 entries); the Northern Regional Performance Nursery (NRPN, 30 entries); the Uniform Barley Winterhardiness (UBWHN, 18 entries).

Trial Conditions

Both yield trials and observation rows at the Northeast Research Station were planted into flax stubble under adequate soil moisture conditions on 8 September 2005. Starter fertilizer was applied with the planter. Maverick was applied in mid October 2005 at the rate of 0.66 oz per acre. Cheat grass competed with winter wheat, causing uneven stand, which resulted in unuseful observation row data. Grain yield and test weight showed large coefficient of variability values (24%) resulting in unuseful data from this site. The CPT Variety Trial from other locations in South Dakota is presented in Table 1.

Acknowledgements

Each year, 800-1000 new cross combinations are made and 800-1000 new experimental lines are developed by the winter wheat breeding program. In addition to the excellent support of our wheat pathology programs (small grains pathology and virology), the solid and consistent financial support from the SD Wheat Commission and the SD Crop Improvement Association are vitally important to ensuring continued availability of improved winter wheat varieties for producers in South Dakota.

Table 1. Yield results of entries in the 2006 Crop Performance Testing (CPT) nursery.

Grain Yield (bu/a)

Entry $	Brookings 06'	Water town 06'	Platte 06'	Highmore 06'	D. Lakes 06'	Winner 1 06'	Winner 2 06'	Martin 06'	Oelrichs 06'	Bison 06'	Sturgis 06'	Wall 06'	State 06' †	State 06' ±	3-yr
Darrell	84	48	53	42	32	37	39	52	55	19	39	43	50	47	52
Hatcher	78	50	55	46	24	38	35	55	62	12	38	41	50	46	
NuDakota	89	52	72	49	27	37	25	50	58	16	31	47	50	48	
SD01058	79	46	61	50	27	40	37	51	55	14	35	44	50	47	
SD98W175-1	77	67	59	44	33	45	39	47	55	13	33	43	49	49	
Harry	77	36	48	45	37	39	36	44	60	19	36	46	49	45	
Alliance	81	51	43	48	23	41	39	42	54	17	33	46	49	44	51
Expedition	85	51	56	40	27	37	36	44	56	17	33	46	48	46	49
Wahoo	78	44	49	44	27	35	33	45	61	16	36	48	48	45	52
Trego	72	47	48	51	27	38	38	53	54	17	36	40	48	45	49
Wesley	81	53	49	52	30	34	31	48	52	17	34	42	48	45	49
Alice	72	47	62	46	29	39	34	47	52	17	37	45	48	46	50
Wendy	80	49	49	34	32	38	39	48	49	19	33	46	48	45	49
Overland	85	52	53	32	31	38	35	44	52	13	28	46	47	45	
Nufrontier	66	40	54	50	25	38	35	46	57	11	35	44	47	43	
SD96240-3-1	86	57	48	46	22	38	38	41	45	20	28	44	47	44	
SD02480	77	43	58	41	22	39	41	42	52	18	26	44	46	43	
Arapahoe	82	50	46	45	28	35	33	45	52	17	30	42	46	43	49
Millennium	79	44	57	42	33	31	37	43	56	19	32	41	46	45	53
Jagalene	65	42	51	44	24	41	36	42	57	16	38	42	46	43	51
SD02279	73	43	55	54	27	36	31	42	51	13	31	47	46	43	
SD01W064	74	51	51	37	35	39	36	46	50	18	30	44	46	44	
Harding	71	45	46	49	24	37	37	40	52	18	33	42	45	42	50
Nekota	76	43	50	54	25	37	34	42	50	21	33	36	45	43	46
Tandem	65	48	47	45	25	36	36	44	51	16	35	45	45	42	49
Jerry	78	44	44	42	22	29	31	43	53	20	30	39	45	41	50
SD97059-2	82	50	42	41	25	31	28	45	47	12	30	45	45	42	52
Overley	81	68	69	26	25	30	27	41	54	17	29	46	44	46	
Crimson	73	42	54	46	23	37	33	42	51	14	33	34	44	41	47
SD01122	63	36	56	52	33	28	33	45	52	18	29	43	44	42	
Mean	77	48	53	45	27	37	35	45	54	16	33	43	47	44	50
CV‡	8.6	23.5	23.4	13.2	35.7	9.0	12.2	12.5	8.2	20.0	12.6	11.2	10.7	16.7	14.9
LSD.05£	9.3	15.8	17.4	12.0	13.8	5.4	5.0	8.0	6.2	6.7	6.8	6.8	2.6	3.1	1.8

‡ The CV (coefficient of variability) is a statistical measure of experimental error. In general, yield trials with a CV of 16% or greater are considered to contain too much experimental error for reliable data interpretation.

† 2006 statewide average grain yield excluding locations that have a CV% of more than 15% .

± 2006 statewide average grain yield including high CV% locations.

$ Entries were sorted by 2006 statewide average excluding locations that have a CV% of more than 15%.

£ The LSD (least significant difference) is the minimum value by which two entries must differ in order for that difference to be meaningful (and not be due to random chance alone). If the difference between two entries is equal to or less than the LSD value, the entries are not statistically different.

Spring Wheat Breeding

Karl D. Glover

Our primary objective is to improve the agronomic, milling, and baking characteristics of spring wheat varieties that are well adapted to South Dakota. Prior to the release of a new variety to growers, its advantageous features must be well documented. Characterization of material begins during the second growing season after a cross has been made. Thousands of breeding lines, each representing a potential variety, are created yearly and are subject to removal from consideration based on their susceptibility to disease and lack of agronomic promise. Lines chosen for additional testing are more heavily scrutinized with each successive testing year. Therefore, the number of lines included in preliminary and advanced yield tests is relatively few compared to early generation tests. Spring wheat production environments in our state can be dramatically different from year-to-year and even from location-to-location within a year. Unfortunately, this prevents varieties from being optimally adapted to all production environments. This necessitates that preliminary and advanced yield tests also be conducted in several environments throughout the state. The Northeast Research Station is one of two locations used for testing material in both early- and advanced-selection stages.

Thirty experimental lines appearing to hold the most potential for release as varieties were included in the 2006 Advanced Yield Trials (AYT) along with ten released varieties included for comparative purposes. Not all thirty entries will be selected for continued testing in 2007. Table 1 presents statewide agronomic and Fusarium head blight resistance observations collected from eighteen entries that were grown in both the 2005 and 2006 AYT, as well as grain yield observations from the Northeast Research Station. Statewide data for each entry are presented as an average over seven AYT locations (Aurora, Brookings, Groton, Miller, Redfield, Selby, and South Shore) from both 2005 and 2006 (14 location-year combinations).

Average yield among these entries at the Northeast Research Station was relatively low in both 2005 and 2006 due to dry conditions (Table 1). Fusarium head blight resistance data presented in Table 1 were collected at the Brookings screening nursery in both years and are presented as averages over two location-year combinations.

Among the experimental lines, SD3851 appears most promising as a new variety due to its above average yield potential, high test weight, good level of leaf rust resistance (data not shown), and excellent Fusarium head blight resistance. Breeder seed of SD3851 was increased in 2006 and will be further increased in 2007. Foundation seed should be made available to certified seed producers in 2008. The experimental line, SD3868, consistently produces more grain than all entries with which it is compared, however, its test weight and protein levels are generally on the low end of the spectrum. Breeder seed of SD3868 will be increased in 2007 with a potential release to certified seed producers in 2008.

Efforts carried out, and varieties released, by this program are made possible with financial support provided by the South Dakota Agricultural Experiment Station, South Dakota Wheat Commission, and South Dakota Crop Improvement Association.

Table 1. Agronomic and disease resistance performance data of eighteen hard red spring wheat experimental lines evaluated in 2005 and 2006 Advanced Yield Trials.

Entry	Northeast Research Station Yield (bu/ac)			2005 - 2006 Statewide Averages *					
	2005	2006	2yr.	TW (lb/bu)	Heading (Day)***	Height (in)	Pro (%)	DIS (%)***	Yield (bu/ac)
SD3868	58.4	56.4	57.4	59.4	19.6	36.9	14.7	17.7	54.1
TRAVERSE	48.6	52.2	50.4	58.2	20.8	37.7	14.5	19.4	52.7
GRANGER	52.4	52.2	52.3	60.4	21.4	38.7	15.2	26.8	51.6
SD3870	55.1	51.2	53.1	60.8	20.0	38.9	15.8	18.6	51.6
SD3851	54.2	52.2	53.2	61.7	17.6	35.9	15.5	10.8	51.0
SD3927	43.6	51.3	47.4	60.6	23.9	35.3	14.7	25.7	50.7
KNUDSON	49.1	55.5	52.2	59.9	19.6	35.3	15.8	20.0	50.5
STEELE-ND	53.9	52.3	53.1	60.0	21.9	36.7	15.5	30.4	50.4
BRIGGS	54.1	53.0	53.5	60.1	19.6	35.4	15.7	23.7	50.3
SD3879	52.2	40.8	46.5	59.7	22.1	37.3	14.5	27.4	48.8
RUSS	37.9	47.5	42.7	58.3	21.8	37.6	14.9	29.6	47.6
WALWORTH	48.0	47.9	48.0	59.0	20.6	35.7	15.5	22.9	47.3
SD3934	47.3	46.4	46.9	61.3	21.8	35.6	15.4	13.6	47.0
OXEN	38.5	50.9	44.7	58.2	21.1	33.6	15.2	33.0	46.8
NE108-46	36.6	40.9	38.7	57.0	23.2	31.2	14.6	45.2	43.7
ALSEN	43.6	45.8	44.7	59.8	22.6	34.5	15.9	23.8	43.7
REEDER	32.1	46.3	39.2	57.9	23.4	34.6	15.3	37.2	43.4
NE188-24	22.1	37.2	29.7	53.6	25.6	32.2	14.8	57.6	39.0
MEAN	46.0	48.9	47.4	59.2	21.5	35.8	15.2	26.9	48.3
LSD (0.05)	8.4	5.2	4.9	0.6	0.4	0.7	0.3	8.0	1.9
CV (%)	10.9	6.5	9.0	2.6	3.7	4.4	3.6	25.8	9.7

* Performance based on 14 AYT locations grown in 2005 and 2006.

** Heading date expressed as days after 1 June.

*** DIS (%) calculated as product of average incidence and average severity of entries tested for Fusarium head blight resistance at Brookings nursery in 2005 and 2006.

Northeast Research Farm Annual Report
2006 Alfalfa Production

Vance Owens, Peter Jeranyama, and Chris Lee

Alfalfa cultivars are tested at several South Dakota research stations. Our objective is to provide producers with yield data from currently available alfalfa cultivars to aid them in cultivar selection. Even though our yield trial does not contain all available cultivars, it should be a helpful tool in identifying cultivars suitable for your specific needs.

Materials and Methods

Six replications of each cultivar were planted 28 April 2004 at a rate of 18 lbs pure live seed/acre. Fifty pounds super phosphate (P_2O_5) was applied and incorporated before planting. Later fertilizer application was made when necessary as recommended by the South Dakota State Soil Testing Laboratory. Forage was harvested with a sickle-type harvester equipped with a weigh bin for obtaining fresh plot weights. Random subsamples from the fresh herbage were taken to determine percent dry matter. Alfalfa cultivars were evaluated for maturity prior to harvest. Yield differences among cultivars were tested using the LSD at the 0.10 level of probability when significant F-tests were detected by analysis of variance.

Results

Table 1 provides forage production data for 12 alfalfa cultivars planted in 2004. Yields (tons dry matter/acre) are shown for three cuttings in 2006. Average cumulative yield in 2006 was 4.05 tons dry matter/acre.

Cultivars are ranked from highest to lowest based on cumulative production (2-year total). The least significant difference (LSD) listed at the bottom of each table is used to identify significant differences between the cultivars. If the difference in yield between two cultivars exceeds the given LSD, then they are significantly different.

Acknowledgements

Financial support for this research was provided by marketers of the various alfalfa seed entries and by the South Dakota Agricultural Experiment Station.

Table 1. Forage yield of 12 alfalfa cultivars entered in the South Dakota State University alfalfa testing program. Trial was planted 28 April 2004 at the Northeast Research Farm.

	2006				2005	2-year
Entry	8-Jun	8-Jul	11-Aug	Total	Total	Total
	---------- Tons Dry Matter/Acre ----------					
6200 HT	2.19	1.32	0.81	4.32	5.37	9.69
54Q25	2.15	1.26	0.83	4.24	5.24	9.47
WL 319HQ	2.07	1.28	0.76	4.12	5.35	9.46
54H91	2.28	1.29	0.65	4.21	5.19	9.40
54V46	2.06	1.41	0.86	4.34	5.00	9.34
ProSeed-381 Hyb	1.98	1.28	0.77	4.03	5.24	9.27
eXtreme	2.00	1.16	0.77	3.93	5.31	9.23
HybriForce 420/wet	2.03	1.24	0.70	3.98	5.19	9.17
WL 348AP	2.03	1.27	0.68	3.99	5.10	9.09
6415	1.93	1.26	0.74	3.93	4.97	8.90
Vernal	2.05	1.14	0.62	3.81	4.96	8.77
GH 711	1.86	1.17	0.64	3.67	4.99	8.67
Average	2.05	1.26	0.74	4.05	5.16	9.20
Maturity (Kalu & Fick)	5.1	3.9	5.1			
LSD (P=0.10)	NS	NS	NS	NS	NS	NS
CV (%)	16.0	16.4	28.6	16.6	11.1	13.0
P-value	0.717	0.645	0.602	0.850	0.942	0.955

NS = not significant at 0.10 level of probability

50 lbs P2O5/Acre - preplant

Treflan applied preplant

Forage Grass Variety Performance Trial at Northeast Research Farm

Peter Jeranyama, Vance N. Owens and Chris Lee

Establishment and Management

On 6 May 2005 several cool-season grass species (Table 1) and varieties were planted at the Northeast Research Farm. Plots were 3 feet and 20 feet long and planted with a plot planter with a cone seeder (Carter Manufacturing, Brookston, IN). Each plot comprised 5 rows with 6-inch spacing in a randomized complete block design replicated four times.

Winter injury was scored for each plot on 3 May 2006 at the onset of spring growth and was based on a visual assessment with a ranking of 1= no injury; 6 = completely dead plants. A sickle-bar harvester (Swift Machine) was used to harvest all plots on 7 June and 13 September 2006. Fresh grass samples were obtained randomly from each species during harvest. The wet weight of samples was measured and samples were oven dried to determine yield on a dry matter basis. Herbicides and insecticides were used as needed to successfully establish and manage grass pests. Soil fertility was maintained throughout the trial at levels recommended by the SDSU soil testing laboratory.

Table 1. Grass Common Name and Seeding Rates in the Grass Forage Performance Trial at the Northeast Research Farm.

Grass Common Name	Seeding Rate (lb PLS/ Acre)
Hybrid bromegrass	10
Meadow bromegrass	12
Smooth bromegrass	7
Orchardgrass	8
Perennial ryegrass	20
Reed canarygrass	8
Tall fescue	10
Timothy	8

2006 Results

Winter injury score and forage yields (tons dry matter per acre) are reported in Tables 2 and 3. Released and experimental (when present) names of each cultivar were reported as provided by the Seed Company at the time of entry.

There was noticeable winter injury in perennial ryegrass varieties that in turn affected forage yield. Because of the drought of 2006, grass species did not produce sufficient forage mass to justify a third cutting.

Table 2. Tall fescue Dry matter Yield and Winter Injury Score at Northeast Research Farm, 2006

Cultivar	Winter injury*	7 June	13 September	Season Total
		----------DM tons/ acre----------		
Tuscany II	2.9	3.77	2.11	5.88
PST-5NF	2.8	3.66	2.72	6.38
Barcarella	2.9	3.57	2.85	6.42
Seine	3.8	3.56	2.84	6.40
Drover	3.3	3.23	2.34	5.57
Pradel**	2.5	3.01	1.73	4.74
Bariane	3.8	2.70	2.04	4.74
Fawn	2.8	3.54	2.54	6.08
LSD 5%	0.6	0.61	NS	1.65
CV %	13	12	39	19

NS = non-significant; * winter injury; 1= no injury; 6=dead; evaluated on 3 May 2006
**Pradel is meadow fescue

Table 3. Grass Forage Dry Matter Yield and Winter Injury Score at Northeast Research Farm, 2006

Cultivar	Winter injury*	7 June	13 September	Season Total
		----------DM tons/ acre ----------		
Bromegrass				
Lincoln	1.4	3.74	0.85	4.59
Fleet	2.1	3.48	0.96	4.44
AC Knowles	2.6	3.47	0.73	4.20
Montana	2.3	3.10	1.00	4.10
Orchardgrass				
Pauite 2	2.4	3.38	1.85	5.23
Barexcel	2.6	3.21	1.58	4.79
Potomoc	2.1	3.11	1.70	4.81
Timothy				
Winnetou	1.6	2.93	0.31	3.23
Climax	1.6	3.11	0.26	3.37
Perennial ryegrass				
Barsprinter	4.5	1.16	0.46	1.62
Remington	4.3	1.06	0.55	1.61
Aubisque	5.3	0.47	0.42	0.89
Linn	4.4	1.23	0.35	1.58
Reed canarygrass				
Chiefton	1.8	4.47	1.88	6.35
$LSD_{0.05\ bromegrass}$	0.6	NS	NS	NS
$LSD_{0.05\ orchardgrass}$	NS	NS	NS	NS
$LSD_{0.05\ timothy}$	NS	NS	NS	NS
$LSD_{0.05\ perennial\ ryegrass}$	0.6	0.38	NS	0.47
$LSD_{0.05\ ALL}$	0.6	0.5	0.4	0.7
CV %	8	13	30	13

NS = non-significant; * winter injury; 1= no injury; 6=dead; evaluated on 3 May 2006

Weed Control - W.E.E.D. Project

M. Moechnig, D. Deneke, D. Vos, and J. Alms

Introduction

The Northeast Station provides a strategic location to collect weed control data for northeastern South Dakota. Field plots provide side-by-side comparisons and comparative performance data. Plots are evaluated for weed control and crop tolerance. Yields were harvested from selected studies.

2006 Research

Early spring moisture was adequate for good crop establishment and incorporating pre-emergence herbicides. There was heavy weed pressure in most crop trials, but excellent establishment of small grain crops suppressed weed growth in some studies. Conditions became increasingly dry as the season progressed. Crop growth reduction due to early season competition was more apparent at this research station than at the Brookings Agronomy Farm or the Southeast Experiment Station, which may be partially due to heavy weed pressure and greater moisture stress during the spring and early summer. Small grain yields were generally very good, but corn and soybean yields were below average.

2006 Evaluation/Demonstration Research Projects

1. Corn Herbicide Demonstration
2. Corn Herbicide Demonstration in Resistant Corn
3. Pre and Post Weed Control Programs in Corn
4. Evaluation of Stout Programs for Weed Control in Corn
5. Soybean Herbicide Demonstration
6. Herbicide Resistant Soybean Demonstration
7. Weed Control in Soybeans with Prefix
8. Weed Control in STS/RR Stack Soybeans
9. Cleanwave - Graminicide Combinations in Spring Wheat
10. Broadleaf Weed Control in Spring Wheat with WideMatch and Starane-NXT
11. Grass Control in Spring Wheat
12. Weed Control in Clearfield Spring Wheat with Clearmax
13. Evaluation of Clearmax Tank-Mix Partners
14. Clearmax Application Timing in Spring Wheat
15. Millet Crop Response with Callisto
16. Field Pea Demonstration
17. Weed Control in Flax
18. Callisto - Flax Tolerance
19. Canola Herbicide Tolerance and Weed Control
20. Postemergence Weed Control in Canola

The most common broadleaf weed species included lambsquarters, pigweed species, kochia, wild buckwheat, and wild mustard. Common purslane was a common late emerging weed in some blocks. Green foxtail was the most common grass weed species.

The most relevant results are presented in this publication. Additional research trials were also conducted at this station to evaluate experimental herbicides, additives, or uses of herbicides in alternative crops. Results from some of these studies are reported in the 2006 Weed Control Field Test Data (EMC 678) or on the internet at http://plantsci.sdstate.edu/weeds/. This internet site also contains research results from previous years at the Northeast Experiment Station and other locations across South Dakota.

1. Evaluation of Annual Weed Control Programs in Glyphosate Tolerant Soybeans
2. Grass Control in Spring Wheat with Affinity and Grass Herbicide Tank-Mixes
3. Evaluation of Starane NXT and WideMatch with Grass Herbicides in Spring Wheat
4. Broadleaf Weed Control in Spring Wheat with Experiment Herbicide and Tank-Mixes
5. Preplant-Burndown Weed Control in Spring Wheat
6. Evaluation of Post Harvest Weed Control in Spring Wheat
7. Weed Control in RR Alfalfa
8. Evaluation of Four Seeding Rates with RR Alfalfa

Acknowledgement

Local Extension educators assist with identifying research needs, conducting tours, and incorporating research results into crop production recommendations for growers. Funding for this research is provided by:

1. South Dakota Soybean Research and Promotion Council
2. Consortium for Alternative Crops
3. Crop protection industries

Note:

Data reported in this publication are results from field tests that include labeled product uses, experimental products or experimental rates, combinations, or other unlabeled uses for herbicide products. Tradenames of products used are listed; there frequently are other products available. Refer to the appropriate weed control fact sheet available from county extension offices for herbicide recommendations.

Table 1. Corn Herbicide Demonstration

Demonstration
Variety: DKC-4622
Planting Date: 5/4/06
PRE: 5/4/06
EPOST: 6/1/06; Corn V2-3; Grft 2 lf, 1-4 in; KOCZ 1-3 in.
POST: 6/12/06; Corn V4-8 inches; Grft 2-5 lf, 2-5"; KOCZ 2-5 inches
Soil: Clay loam; 3.0% OM; 6.1 pH

Precipitation:

PRE:	1st week	0.43 inches
	2nd week	0.05 inches
EPOST:	1st week	0.32 inches
	2nd week	0.32 inches
POST:	1st week	0.07 inches
	2nd week	0.39 inches

Grft=Green foxtail
KOCZ=Kochia

Comments: *Pre-emergence:* Green foxtail and kochia control was slightly greater with Harness (acetochlor) at 2.3 pt/A than at 1.5 pt/A. Weed control was slightly greater with Dual II Magnum (S-metolachlor) than Stalwart C (metolachlor). Herbicides that contain atrazine (Lumax, Bicep II Magnum, Stalwart Xtra, Harness Xtra, and Keystone LA) resulted in greater than 95% kochia control.

Pre-emergence followed by post-emergence: Green foxtail control was approximately 85% with Dual II Magnum and 76% with Define SC. The low rate of Balance Pro (isoxaflutole) at 1.75 oz/A plus Resolve (rimsulfuron) at 1 oz/A resulted in only 68% green foxtail control. Other treatments resulted in more than 90% green foxtail control. Kochia control was greater than 97% in each treatment.

Early post-emergence: Green foxtail control with Option (foramsulfuron) ranged from 78 to 85%. Other treatments resulted in 82 to 90% green foxtail control. Kochia control was greater than 97% in each treatment.

Treatment	***Rate/A***	***% Grft 9/21/06***	***% KOCZ 9/21/06***
Check	----	0	0
PREEMERGENCE			
Harness	1.5 pt	75	60
Harness	2.3 pt	90	70
Surpass	2.5 pt	90	80
Dual II Magnum	2 pt	85	75
Stalwart C	2 pt	75	65
Outlook	21 oz	85	75
Degree	4.25 pt	83	70
Define SC	21 oz	75	68
Balance Pro	2.25 oz	68	88
Epic	14.5 oz	83	88
Radius	18 oz	78	95
Lumax	3 qt	68	97
Bicep II Magnum	2 qt	65	95
Stalwart Xtra	2.1 qt	60	95
Harness Xtra 6L	2.1 qt	78	98
Keystone LA	2.2 qt	88	98

2006 Corn Herbicide Demonstration
Northeast Research Farm
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Treatment	***Rate/A***	***% Grft 9/21/06***	***% KOCZ 9/21/06***
PREEMERGENCE (Continued . . .)			
Balance Pro+Define SC+atrazine	2.25 oz+12 oz+.75 qt	75	95
Python+Surpass	1.25 oz+2.5 pt	78	90
PREEMERGENCE & POSTEMERGENCE			
Dual II Magnum&Callisto+COC+28% N	1.67 pt&3 oz+1%+2 qt	83	98
Balance Pro&Option+MSO+28% N	2 oz&1.5 oz+1.5 pt+2 qt	96	97
Balance Pro&Stout+COC+AMS	2 oz&.75 oz+1%+2 lb	95	98
Balance Pro+Resolve& Buctril+atrazine	1.75 oz+1 oz& 1 pt+1 pt	68	99
Outlook&Distinct+NIS+28% N	21 oz&6 oz+.25%+2 qt	97	99
Outlook&Marksman+NIS+28% N	21 oz&2 pt+.125%+2 qt	90	99
Surpass&2,4-D amine	2.5 pt&1 pt	94	99
Surpass&Aim+atrazine+COC+28% N	2.5 pt&.5 oz+2 pt+1%+2 qt	92	99
Keystone LA&Hornet WDG+Clarity+ NIS+AMS	2 qt&3 oz+4 oz+ .25%+2.5 lb	94	99
Surpass&Accent+atrazine+ COC+28% N	1.25 pt&.67 oz+1.5 pt+ 1%+2 qt	97	99
Surpass&Stout+atrazine+ COC+28% N	1.25 pt&.5 oz+1.5 pt+ 1%+2 qt	96	99
Dual II Magnum&Northstar+NIS+28% N	1.67 pt&5 oz+.25%+2 qt	85	99
Define SC&Buctril+atrazine	21.7 oz&1 pt+1 pt	76	99
Define SC&Buctril+atrazine+Callisto	12 oz&1 pt+1 pt+1 oz	76	99
EARLY POSTEMERGENCE			
Option+atrazine+MSO+28% N	1.5 oz+1.5 pt+1.5 pt+2 qt	78	99
Option+Callisto+MSO+28% N	1.5 oz+2 oz+1.5 pt+1.5 qt	78	98
Define SC+Option+Callisto+ MSO+28% N	12 oz+1.5 oz+1 oz+ 1.5 pt+2 qt	90	97
Define SC+Option+Distinct+ MSO+28% N	12 oz+1.5 oz+4 oz+ 1.5 pt+2 qt	89	98
Option+Distinct+MSO+28% N	1.5 oz+4 oz+1.5 pt+2 qt	85	99
Option+Northstar+MSO+28% N	1.5 oz+3 oz+1.5 pt+2 qt	85	99
Steadfast+atrazine+COC+28% N	.75 oz+1.5 pt+1%+2 qt	82	98
Lumax+Steadfast+COC+AMS	1.5 qt+.75 oz+1%+2.5 lb	86	99
Steadfast+atrazine+Callisto+ COC+AMS	.75 oz+3 pt+2 oz+ 1%+2.5 lb	84	99

Table 2. Corn Herbicide Demonstration in Resistant Corn

Demonstration
Variety: DKC 4622; Pioneer 38469
Planting date: 5/4/06
PRE: 5/4/06
EPOST: 6/1/06; Corn V2, 3-5 lf; Grft 1-4 in, 2-lf to tiller
POST: 6/12/06; Corn V4, 8 in; Grft 2-5 lf, 1-5 in; Colq 2-5 in; KOCZ 2-4 in.
Soil: Clay loam; 3.0% OM; 6.1 pH

Precipitation:

PRE:	1st week	0.43 inches
	2nd week	0.05 inches
EPOST:	1st week	0.07 inches
	2nd week	0.39 inches
POST:	1st week	0.32 inches
	2nd week	0.32 inches

Grft=Green foxtail
Colq=Common lambsquarters
KOCZ=Kochia

Comments: Herbicide programs were evaluated in Liberty Link and Roundup Ready corn. All treatments resulted in very good control of green foxtail and the broadleaf weed species. In the early post-emergence treatments, tank-mix partners with Roundup resulted in slightly greater control of green foxtail.

Treatment	***Rate/A***	***% Grft 9/21/06***	***% Colq 9/21/06***	***% KOCZ 9/21/06***
Liberty Link Check	-----	0	0	0
EARLY POSTEMERGENCE				
Liberty+atrazine+AMS	32 oz+1 pt+3 lb	90	98	98
Liberty+Resolve+AMS	32 oz+1 oz+3 lb	95	98	95
Liberty+Callisto+AMS	32 oz+1.5 oz+3 lb	85	98	95
EARLY POSTEMERGENCE & POSTEMERGENCE				
Liberty+AMS&Liberty+AMS	24 oz+3 lb&24 oz+3 lb	95	96	98
PREEMERGENCE & POSTEMERGENCE				
Define SC&Liberty+atrazine+AMS	12 oz&32 oz+1 pt+3 lb	98	99	99
Roundup Ready Check	----	0	0	0
EARLY POSTEMERGENCE				
Roundup WeatherMax+AMS	22 oz+2.5 lb	90	94	98
Touchdown Total+Lumax+AMS	24 oz+1.5 qt+2.5 lb	95	97	99
Roundup WeatherMax+Resolve+AMS	22 oz+1 oz+2.5 lb	95	95	99
Roundup WeatherMax+Resolve+ atrazine+AMS	22 oz+1 oz+ 2 pt+2.5 lb	98	99	99
Roundup WeatherMax+atrazine+AMS	22 oz+2 pt+2.5 lb	88	99	99
Roundup WeatherMax+Harness+AMS	22 oz+1 pt+2.5 lb	97	95	99
Roundup WeatherMax+Stalwart C+AMS	22 oz+1 pt+2.5 lb	93	90	99
Roundup WeatherMax+Outlook+AMS	22 oz+.75 pt+2.5 lb	95	95	99
Roundup WeatherMax+Prowl H_2O+AMS	22 oz+2.5 pt+2.5 lb	97	98	99

2006 Corn Herbicide Demonstration in Resistant Corn
Northeast Research Farm
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Treatment	***Rate/A***	***% Grft 9/21/06***	***% Colq 9/21/06***	***% KOCZ 9/21/06***
POSTEMERGENCE				
Roundup WeatherMax+AMS	22 oz+2.5 lb	97	97	99
Roundup WeatherMax+Resource+AMS	22 oz+4 oz+2.5 lb	97	99	99
Roundup WeatherMax+Callisto+AMS	22 oz+1.5 oz+2.5 lb	97	98	99
Roundup WeatherMax+2,4-D amine+AMS	22 oz+8 oz+2.5 lb	98	98	99
Roundup WeatherMax+Aim+AMS	22 oz+.5 oz+2.5 lb	99	98	99
EARLY POSTEMERGENCE & POSTEMERGENCE				
Roundup WeatherMax+AMS&	22 oz+2.5 lb&			
Roundup WeatherMax+AMS	22 oz+2.5 lb	90	96	99
PREEMERGENCE & POSTEMERGENCE				
Atrazine&Roundup WeatherMax+AMS	2 pt&22 oz+2.5 lb	99	99	99
Harness&Roundup WeatherMax+AMS	2 pt&22 oz+2.5 lb	99	99	99
Harness&Roundup WeatherMax+AMS	1 pt&22 oz+2.5 lb	99	99	99
Dual II Magnum&	1.67 pt&			
Roundup WeatherMax+AMS	22 oz+2.5 lb	99	99	99
Keystone LA&	1.1 qt&			
Roundup WeatherMax+AMS	22 oz+2.5 lb	99	99	99
Outlook&Roundup WeatherMax+AMS	12 oz&22 oz+2.5 lb	98	98	99
Lumax&Touchdown Total+AMS	1.5 qt&24 oz+2.5 lb	99	99	99

Table 3. Pre and Post Weed Control Programs in Corn

RCB; 4 reps
Variety: DKC-4622
Planting Date: 5/4/06
PRE: 5/4/06
EPOST: 6/12/06; Corn V3, 5-7 in; Grft 1-4 in; Wibw 1-5 in; Wimu 2-6 in; Colq 2-4 in
POST: 6/19/06; Corn 8-12 in; Grft 2-5 lf, 2-5 in; Wibw 2-5 lf; Wimu 4-6 in; Colq 2-5 in
Soil: Clay loam; 3.9% OM; 6.2 pH

Precipitation:

PRE:	1st week	0.43 inches
	2nd week	0.05 inches
EPOST:	1st week	0.32 inches
	2nd week	0.32 inches
POST:	1st week	0.32 inches
	2nd week	0.71 inches

Grft=Green foxtail
Wibw=Wild buckwheat
Wimu=Wild mustard
Colq=Common lambsquarter

Comments: Various weed control programs were evaluated for conventional and Roundup Ready corn. Broadleaf weed control was very good in all treatments. Green foxtail control was greater in the Glyphomax-Xrt (glyphosate) treatments than in the conventional program.

Treatment	***Rate/A***	***% Grft 7/7/06***	***% Wibw 7/7/06***	***% Wimu 7/7/06***	***% Grft 9/21/06***	***% Colq 9/21/06***
Check	----	0	0	0	0	0
PREEMERGENCE & EARLY POSTEMERGENCE						
Surpass&Hornet WDG+ Atrazine+Callisto+ COC+AMS	2.5 pt&3 oz+ 8 oz+.75 oz+ 1%+2.5 lb	92	99	99	90	99
PREEMERGENCE						
Keystone LA+Hornet WDG	2.2 qt+3 oz	93	96	99	89	98
Keystone LA	2.2 qt	89	93	95	84	96
PREEMERGENCE & EARLY POSTEMERGENCE						
Keystone LA&Starane	2.2 qt&.5 pt	92	99	99	90	97
EARLY POSTEMERGENCE						
Steadfast+Starane+ Atrazine+COC+28% N	.75 oz+.5 pt+ 1 qt+1%+2 qt	89	99	99	83	99
PREEMERGENCE & POSTEMERGENCE						
Keystone LA& Glyphomax-Xrt+AMS	1.1 qt& 24 oz+2.5 lb	99	96	99	98	99
GF-1834& Glyphomax-Xrt+AMS	1.75 pt& 24 oz+2.5 lb	99	94	99	98	97
LSD (.05)		3	3	2	5	2

Table 4. Evaluation of Stout Programs for Weed Control in Corn

RCB; 4 reps
Planting Date: 5/4/06
Variety: DKC-4622
PRE: 5/4/06
POST: 6/12/06; Corn V3, 5-7 in; Grft 2-5 lf, 2-5 in; Colq 2-4 in; KOCZ 2-4 in.
Soil: Clay loam; 3.9% OM; 6.2 pH

Precipitation:

PRE:	1st week	0.43 inches
	2nd week	0.05 inches
POST:	1st week	0.32 inches
	2nd week	0.32 inches

Grft=Green foxtail
Colq=Common lambsquarters
KOCZ=Kochia

Comments: Herbicide programs with Stout (nicosulfuron + thifensulfuron) were evaluated for grass and broadleaf weed control in conventional corn. Treatments with atrazine as a tank-mix partner appeared to antagonize green foxtail control. Common lambsquarters control was greater than 95% in all treatments. Kochia control was greater than 94% in all treatments except Dual II Magnum (S-metolachlor) followed by Stout at 0.5 or 0.75 oz/A.

Treatment	***Rate/A***	***% Grft 7/7/06***	***% Grft 8/31/06***	***% Colq 8/31/06***	***% KOCZ 8/31/06***
Check	----	0	0	0	0
PREEMERGENCE & POSTEMERGENCE					
Resolve+atrazine 90DF& Stout+COC+AMS	1.5 oz+1.1 lb& .75 oz+1%+2 lb	93	89	99	96
Resolve+Balance Pro& Stout+COC+AMS	1.5 oz+1.5 oz& .75 oz+1%+2 lb	94	88	99	92
Resolve+atrazine 90DF+Balance Pro& Stout+COC+AMS	1.5 oz+1.1 lb+1.5 oz& .75 oz+1%+2 lb	95	91	99	99
Dual II Magnum& Stout+COC+AMS	.5 pt& .5 oz+1%+2 lb	91	92	95	75
Dual II Magnum& Stout+COC+AMS	.5 pt& .75 oz+1%+2 lb	92	94	97	81
Bicep II Magnum& Stout+COC+AMS	1.05 qt& .5 oz+1%+2 lb	93	92	95	96
Bicep II Magnum& Stout+COC+AMS	1.05 qt& .75 oz+1%+2 lb	93	90	97	97
Dual II Magnum&Stout+atrazine+ COC+AMS	.5 pt&.5 oz+1.1 lb+ 1%+2 lb	88	79	99	99
Dual II Magnum&Stout+ +atrazine 90DF+COC+AMS	.5 pt&.75 oz+ 1.1 lb+1%+2 lb	90	82	98	99
Bicep II Magnum&Stout+ atrazine 90DF+COC+AMS	1.05 qt&.5 oz+ 1.1 lb+1%+2 lb	88	81	99	99
Bicep II Magnum&Stout+ atrazine 90DF+COC+AMS	1.05 qt&.75 oz+ 1.1 lb+1%+2 lb	91	87	99	99

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Treatment	***Rate/A***	***% Grft 7/7/06***	***% Grft 8/31/06***	***% Colq 8/31/06***	***% KOCZ 8/31/06***
PREEMERGENCE & POSTEMERGENCE					
Dual II Magnum&Stout+ Callisto+atrazine 90DF+ COC+AMS	.5 pt&.5 oz+ 1.5 oz+.56 lb+ 1%+2 lb	83	74	99	99
Dual II Magnum&Stout+ Callisto+atrazine 90DF+ COC+AMS	.5 pt&.75 oz+ 1.5 oz+.56 lb+ 1%+2 lb	85	77	99	99
Bicep II Magnum&Stout+ Callisto+atrazine 90DF+ COC+AMS	1.05 qt&.5 oz+ 1.5 oz+.56 lb+ 1%+2 lb	86	77	99	99
Bicep II Magnum&Stout+ Callisto+atrazine 90DF+ COC+AMS	1.05 qt&.75 oz+ 1.5 oz+.56 lb+ 1%+2 lb	87	81	99	98
Dual II Magnum&Callisto+ COC+AMS	1 pt&3 oz+ 1%+2 lb	68	51	99	96
Dual II Magnum&Stout+ Distinct+COC+AMS	.5 pt&.5 oz+ 2 oz+1%+2 lb	90	88	99	99
Dual II Magnum&Stout+ Distinct+COC+AMS	.5 pt&.75 oz+ 2 oz+1%+2 lb	93	89	99	99
Bicep II Magnum&Stout+ Distinct+COC+AMS	1.05 qt&.5 oz+ 2 oz+1%+2 lb	92	89	97	99
Bicep II Magnum&Stout+ Distinct+COC+AMS	1.05 qt&.75 oz+ 2 oz+1%+2 lb	92	89	99	99
Balance Pro&Stout+ COC+AMS	1.5 oz&.75 oz+ 1%+2 lb	94	92	96	94
LSD (.05)		3	7	3	6

Table 5. Soybean Herbicide Demonstration

Demonstration
Variety: AG 1401
Planting Date: 5/18/06
PRE: 5/18/06
EPOST: 6/12/06; Soybean 1 tri; Grft 1-3 in; Colq 1-3 in; Rrpw 1-3 in; Corw 1-4 in.
POST: 6/19/06; Soybean 2 tri; Grft 4-7 in; Colq 2-5 in; Rrpw 2-5 in; Corw 2-6 in.
Soil: Silty clay loam; 3.2% OM; 6.3 pH

Precipitation:

PRE:	1st week	1.19 inches
	2nd week	0.26 inches
EPOST:	1st week	0.32 inches
	2nd week	0.32 inches
POST:	1st week	0.32 inches
	2nd week	0.71 inches

Grft=Green foxtail
Colq=Common lambsquarter
Rrpw=Redroot pigweed
Corw=Common ragweed

Comments: *Pre-emergence:* Only the tank mixture of Outlook + Valor + Python resulted in at least 90% control of each weed species. Other treatments resulted in less than 65% control of common ragweed.

Pre-emergence followed by post-emergence: Broadleaf weed control with Valor (flumioxazin) was slightly greater at the 3 oz/A rate compared with the 2 oz/A rate. Common lambsquarters control was only approximately 60% with Valor + Python (flumioxazin + flumetsulam) or Valor + FirstRate (flumioxazin + cloransulam).

Early post-emergence followed by post-emergence: Broadleaf and grass herbicides were applied at different times to avoid antagonism. Harmony GT (thifensulfuron) resulted in the greatest common lambsquarters control (89%) but least common ragweed control (70%). Other broadleaf herbicides resulted in less than 75% common lambsquarters control but more than 98% common ragweed control.

Early post-emergence: Raptor (imazamox) resulted in the greatest common lambsquarters control (93%) but least common ragweed control (70%). Each treatment resulted in very good control of green foxtail and pigweed.

Treatment	***Rate/A***	***% Grft 9/21/06***	***% Colq 9/21/06***	***% Rrpw 9/21/06***	***% Corw 9/21/06***
Check	----	0	0	0	0
PREEMERGENCE					
Prowl H_2O	2.75 pt	90	90	70	60
Boundary	2.5 pt	96	96	98	65
Pursuit Plus	2.5 pt	95	96	99	50
Outlook+Valor+Python	16 oz+2 oz+1 oz	95	95	96	90
Intrro+Blanket	1.5 qt+4 oz	90	92	90	65
PREEMERGENCE & POSTEMERGENCE					
Intrro&Poast Plus+COC	2 qt&1.5 pt+1 qt	98	88	99	98
Prowl H_2O&Poast Plus+ Raptor+Flexstar+COC+28% N	2.25 pt&1.5 pt+ 4 oz+10 oz+1 qt+1 qt	99	94	99	95
Boundary&Poast Plus+COC	2.5 pt&1.5 pt+1 qt	99	95	96	95
Valor&Poast Plus+COC	2 oz&1.5 pt+1 qt	99	60	80	75
Valor&Poast Plus+COC	3 oz&1.5 pt+1 qt	99	65	90	85

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Treatment	***Rate/A***	***% Grft 9/21/06***	***% Colq 9/21/06***	***% Rrpw 9/21/06***	***% Corw 9/21/06***
PREEMERGENCE & POSTEMERGENCE (Continued . . .)					
Python&Select+COC	1.33 oz&7 oz+1 qt	99	94	55	80
Valor+Python&Select+COC	2 oz+1 oz&7 oz+1 qt	99	95	60	85
Valor+FirstRate&Select+COC	2 oz+.3 oz&7 oz+1 qt	99	98	60	90
Blanket&Assure II+COC	3.5 oz&7 oz+1 qt	98	98	85	70
Intrro&Raptor+MSO+28% N	2 qt&4 oz+1 qt+1 qt	99	99	99	60
Intrro&FirstRate+MSO+28% N	2 qt&.3 oz+1 qt+1 qt	97	75	99	90
EARLY POSTEMERGENCE & POSTEMERGENCE					
Ultra Blazer+NIS&Poast Plus+COC	1.5 pt+.25%&1.5 pt+1 qt	99	65	98	98
Phoenix+COC&Poast Plus+COC	.8 pt+1 qt&1.5 pt+1 qt	99	40	99	99
Flexstar+MSO+28% N& Poast Plus+COC	16 oz+1 qt+1 qt& 1.5 pt+1 qt	99	75	99	98
FirstRate+MSO+28% N& Poast Plus+COC	.3 oz+1 qt+1 qt& 1.5 pt+1 qt	99	50	65	98
Harmony GT 75WG+NIS& Poast Plus+COC	.083 oz+.25%& 1.5 pt+1 qt	98	89	98	70
EARLY POSTEMERGENCE					
FirstRate+Flexstar+Select+ MSO+28% N	.3 oz+10 oz+6 oz+ 1 qt+1 qt	98	70	98	95
Flexstar+Select+MSO+28% N	15 oz+6 oz+1 qt+1 qt	99	82	97	98
Raptor+MSO+28% N	5 oz+1 qt+1 qt	99	93	99	70

Table 6. Herbicide Resistant Soybean Demonstration

Demonstration
Variety: AG 1401
Planting Date: 5/18/06
PRE: 5/18/06
EPOST: 6/12/06; Soybean 1 tri; Grft 1-3 in;
Rrpw 1-3 in; Colq 1-3 in; Corw 1-4 in; Copu 1-4 in.
POST: 6/19/06; Soybean 2 tri; Grft 4-7 in;
Rrpw 2-5 in; Colq 2-5 in; Corw 2-6 in; Copu 4-10 in rosette
POST2: 6/26/06; Soybean 3-4 tri; Grft 5-10 in;
Rrpw 3-7 in; Colq 3-7 in; Corw 3-8 in; Copu 8-12 in rosette

Soil: Silty clay loam; 3.2% OM; 6.3 pH

Precipitation:

PRE:	1st week	1.19 inches
	2nd week	0.26 inches
EPOST:	1st week	0.32 inches
	2nd week	0.32 inches
POST:	1st week	0.32 inches
	2nd week	0.71 inches
POST2:	1st week	0.71 inches
	2nd week	0.05 inches

Grft=Green foxtail
Rrpw=Redroot pigweed
Colq=Common lambsquarters
Corw=Common ragweed
Copu=Common purslane

COMMENTS: Various herbicide programs in Roundup Ready soybeans were evaluated for weed control. All treatments with a pre-emergence herbicide applied prior to a post-emergence application of Roundup resulted in nearly complete weed control. In the early post-emergence treatments, common lambsquarters control was slightly greater with the Roundup tank-mix partners. Common purslane control appeared to decrease with later post-emergence applications.

Treatment	***Rate/A***	***% Grft 9/21/06***	***% Rrpw 9/21/06***	***% Colq 9/21/06***	***% Corw 9/21/06***	***% Copu 9/21/06***
Check	----	0	0	0	0	0
PREEMERGENCE & POSTEMERGENCE						
Prowl H_2O&Extreme+ NIS+AMS	2.25 pt&1.5 qt+ .25%+2.5 lb	99	99	98	99	99
Python& Roundup WeatherMax+AMS	1 oz& 22 oz+2.5 lb	99	99	99	99	99
Valor& Roundup WeatherMax+AMS	2 oz& 22 oz+2.5 lb	99	99	98	99	99
Valor+Python& Roundup WeatherMax+AMS	1.5 oz+1 oz& 22 oz+2.5 lb	99	99	99	99	99
Valor+FirstRate& Roundup WeatherMax+AMS	1.5 oz+.3 oz& 22 oz+2.5 lb	99	99	98	99	99
Spartan 4F& Roundup WeatherMax+AMS	3 oz& 22 oz+2.5 lb	99	99	99	99	99
Axiom& Roundup WeatherMax+AMS	10 oz& 22 oz+2.5 lb	99	99	99	99	99
Domain& Roundup WeatherMax+AMS	10 oz& 22 oz+2.5 lb	99	99	99	99	99
Sencor DF& Roundup WeatherMax+AMS	8 oz& 22 oz+2.5 lb	99	99	99	99	99
Boundary& Roundup WeatherMax+AMS	1.5 pt& 22 oz+2.5 lb	99	99	99	99	99

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Treatment	***Rate/A***	***% Grft 9/21/06***	***% Rrpw 9/21/06***	***% Colq 9/21/06***	***% Corw 9/21/06***	***% Copu 9/21/06***
EARLY POSTEMERGENCE						
Roundup WeatherMax+AMS	22 oz+2.5 lb	99	98	90	99	97
Extreme+NIS+AMS	1.5 qt+.25%+2.5 lb	99	98	98	99	99
Roundup WeatherMax+ Intrro+AMS	22 oz+ 1.5 qt+2.5 lb	99	98	98	99	99
Roundup WeatherMax+ FirstRate+AMS	22 oz+ .3 oz+2.5 lb	99	99	97	99	99
POSTEMERGENCE						
Roundup WeatherMax+AMS	22 oz+2.5 lb	99	98	97	99	88
Roundup WeatherMax+ Harmony GT 75WG+AMS	11 oz+ .083 oz+2.5 lb	99	99	96	99	85
Roundup WeatherMax+Aim+AMS	11 oz+.25 oz+2.5 lb	99	99	94	99	80
Roundup WeatherMax+ Resource+AMS	11 oz+ 4 oz+2.5 lb	99	99	90	99	70
Roundup WeatherMax+ Flexstar+AMS	11 oz+ 8 oz+2.5 lb	99	97	95	98	70
POSTEMERGENCE 2						
Roundup WeatherMax+AMS	22 oz+2.5 lb	99	99	98	99	50
Roundup WeatherMax+AMS	44 oz+2.5 lb	99	99	99	99	80
Roundup WeatherMax+ Harmony GT 75WG+AMS	22 oz+ .083 oz+2.5 lb	99	99	99	99	70
Roundup WeatherMax+Aim+AMS	22 oz+.25 oz+2.5 lb	99	99	99	99	70
Roundup WeatherMax+ Resource+AMS	22 oz+ 4 oz+2.5 lb	99	99	99	99	70
Roundup WeatherMax+ Flexstar+AMS	22 oz+ 8 oz+2.5 lb	99	99	99	99	70
Roundup WeatherMax+ FirstRate+AMS	22 oz+ .3 oz+2.5 lb	99	99	99	99	75

Table 7. Weed Control in Soybeans with Prefix

RCB; 4 reps
Planting Date: 5/18/06
Variety: AG 1401
PRE: 5/18/06
EPOST: 6/12/06; Soybean 1 tri; Grft 2-4 lf, 1-3 in; Colq 1-2 in; Wimu 1-4 in
POST: 6/19/06; Soybean 2 tri; Grft 1-4 in; Colq 1-2 in; Wimu 2-4 in
POST2: 6/26/06; Soybean 3 tri; no weeds
Soil: Clay loam; 3.9% OM; 6.2 pH

Precipitation:

PRE:	1st week	1.19 inches
	2nd week	0.26 inches
EPOST:	1st week	0.32 inches
	2nd week	0.32 inches
POST:	1st week	0.32 inches
	2nd week	0.17 inches
POST2:	1st week	0.71 inches
	2nd week	0.05 inches

Bdlf=Broadleaves – common lambsquarter; wild mustard
Grft=Green foxtail
Colq=Common lambsquarter
Wimu=Wild mustard

Comments: Prefix (S-metolachlor) was evaluated in Touchdown (glyphosate) programs in glyphosate tolerant soybeans. Grass and broadleaf control with Prefix followed by Touchdown was greater than 97% at the latest evaluation date. Weed control with Prefix at the lowest rate (1.5 pt/A) was similar to the highest rate (2.5 pt/A) and the treatment with Boundary (S-metolachlor + metribuzin). Soybean grain yield was similar among treatments.

Treatment	***Rate/A***	***% Grft 6/19/06***	***% Bdlf 6/19/06***	***% Grft 7/7/06***	***% Colq 7/7/06***	***% Wimu 7/7/06***	***% Grft 9/21/06***	***% Colq 9/21/06***	***Yield bu/A***	
PREEMERGENCE & POSTEMERGENCE										
Prefix&	1.5 pt&									
Touchdown Total+AMS	24 oz+17 lb/100 gal			92	96	99	98	99	99	98
Prefix&	2 pt&									
Touchdown Total+AMS	24 oz+17 lb/100 gal			93	96	99	99	99	99	98
Prefix&	2.5 pt&									
Touchdown Total+AMS	24 oz+17 lb/100 gal			94	98	99	98	99	99	97
Boundary&	1.5 pt&									
Touchdown Total+AMS	24 oz+17 lb/100 gal			90	94	99	99	99	99	99
EARLY POSTEMERGENCE										
Touchdown Total+AMS	24 oz+17 lb/100 gal	—	—	97	96	96	92	92	32.5	
EARLY POSTEMERGENCE & POSTEMERGENCE 2										
Touchdown Total+AMS&	24 oz+17 lb/100 gal&									
Touchdown Total+AMS	24 oz+17 lb/100 gal			—	—	99	99	99	99	99
Check	----	0	0	0	0	0	0	0	6.7	
LSD (.05)		3	2	1	2	1	1	1	5.5	

Table 8. Weed Control in STS/RR Stack Soybeans

RCB; 4 reps
Planting Date: 5/18/06
Variety: DSR 1500
PRE: 5/18/06
POST: 6/12/06; Soybean 1 tri; Grft 2-4 lf, 1-3 in; Rrpw 1-2 in; Colq 1-2 in; Wimu 1-4 in.
POST2: 6/19/06; Soybean 2 tri; Grft 1-4 in; Rrpw 1-3 in; Colq 1-3 in; Wimu 2-5 in.
Soil: Clay loam; 3.9% OM; 6.2 pH

Precipitation:

PRE:	1st week	1.19 inches
	2nd week	0.26 inches
POST:	1st week	0.32 inches
	2nd week	0.32 inches
POST2:	1st week	0.32 inches
	2nd week	0.71 inches

Grft=Green foxtail
Rrpw=Redroot pigweed
Colq=Common lambsquarter
Wimu=Wild mustard

Comments: This study was established to evaluate tank-mix options with Synchrony STS and Roundup in soybeans that are tolerant to both sulfonyl urea herbicides and glyphosate. Synchrony STS is a pre-mixture of chlorimuron (e.g. Classic) and thifensulfuron (e.g. Harmony). The rate of Synchrony STS (0.25 oz/A) used in this study may also be used in conventional soybeans, but Synchrony may be applied at higher rates (0.5 oz/A) in STS soybeans. All treatments resulted in nearly complete weed control based on the late weed control evaluation date. Many treatments with Roundup and Synchrony STS resulted in slightly greater lambsquarters control than Roundup + Assure II (quizalofop), but yield was similar among most treatments.

Treatment	***Rate/A***	***% Grft 7/7/06***	***% Rrpw 7/7/06***	***% Colq 7/7/06***	***% Wimu 7/7/06***	***% Grft 9/21/06***	***% Colq 9/21/06***	***Yield bu/A***
PREEMERGENCE & POSTEMERGENCE 2								
Linex 4L&	1 pt&							
Roundup WeatherMax+AMS	22 oz+17 lb/100 gal	99	99	98	99	98	97	34.3
Synchrony STS&	.25 oz&							
Roundup WeatherMax+AMS	22 oz+17 lb/100 gal	99	99	99	99	99	97	36.4
Synchrony STS+Linex 4L&	.25 oz+1 pt&							
Roundup WeatherMax+AMS	22 oz+17 lb/100 gal	99	99	99	99	99	98	35.7
Classic+Harmony GT 50SG+	.33 oz+.5 oz+							
Linex 4L&	1 pt&							
Roundup WeatherMax+AMS	22 oz+17 lb/100 gal	99	99	99	99	97	97	35.8
Classic+Harmony GT 50SG&	.33 oz+.5 oz&							
Roundup WeatherMax+AMS	22 oz+17 lb/100 gal	99	99	99	99	99	98	36.8
POSTEMERGENCE								
Synchrony STS+	.25 oz+							
Roundup WeatherMax+AMS	22 oz+17 lb/100 gal	95	98	95	98	95	93	35.2
Harmony GT 50SG+	.082 oz+							
Roundup WeatherMax+AMS	22 oz+17 lb/100 gal	97	97	97	98	95	92	33.8
Classic+Harmony GT 50SG&	.33 oz+.5 oz&							
Roundup WeatherMax+AMS	22 oz+17 lb/100 gal	97	98	96	98	94	94	34.9
Harmony GT 50SG+	.5 oz+							
Roundup WeatherMax+AMS	22 oz+17 lb/100 gal	96	97	98	98	92	95	35.6
Roundup WeatherMax+Assure II+	22 oz+5 oz+							
COC+AMS	.5%+17 lb/100 gal	96	96	95	98	95	90	35.2
Check	----	0	0	0	0	0	0	6.0
LSD (.05)		18	1	2	1	4	3	2.9

Table 9. Cleanwave – Graminicide Combinations in Spring Wheat

RCB; 4 reps
Variety: Granger
Planting Date: 5/2/06
POST: 6/2/06; Sp Wht 4-5 lf, 4-6 in; Grft 2-4 lf, 1-3 in.
Soil: Clay loam; 4.1% OM; 5.8 pH

Precipitation:
POST: 1st week 0.32 inches
2nd week 0.32 inches

VCRR=Visual Crop Response Rating (0=no injury;100=complete kill)
Grft=Green foxtail

Comments: CleanWave (aminopyralid + fluroxypyr) was tank-mixed with several grass herbicides to evaluate possible antagonism of grass control. CleanWave is a relatively new herbicide that is currently labeled for use in South Dakota west of the Missouri River. Green foxtail control was not reduced when any of the tested grass herbicides were mixed with CleanWave, suggesting no evidence of antagonism in this trial. Green foxtail control was less in the Rimfire (propoxycarbazone + mesosulfuron) and Silverado (mesosulfuron) treatments than with the other grass herbicides.

Treatment	***Rate/A***	***% Grft 7/17/06***	***% Grft 8/22/06***
Check	----	0	0
POSTEMERGENCE			
Axial+Adigor Adj	8.2 oz+.6 pt	99	99
Axial+Adigor Adj+Cleanwave	8.2 oz+.6 pt+13.7 oz	99	98
Axial+Adigor Adj+Cleanwave+MCPA ester	8.2 oz+.6 pt+13.7 oz+8.6 oz	99	98
Axial+Adigor Adj+WideMatch	8.2 oz+.6 pt+16 oz	99	98
Puma	6.4 oz	99	98
Puma+Cleanwave	6.4 oz+13.7 oz	99	99
Puma+Cleanwave+MCPA ester	6.4 oz+13.7 oz+8.6 oz	99	98
Puma+Bronate Advanced	6.4 oz+12.8 oz	98	98
Discover NG	12.8 oz	99	98
Discover NG+Cleanwave	12.8 oz+13.7 oz	99	98
Discover NG+Cleanwave+MCPA ester	12.8 oz+13.7 oz+8.6 oz	97	97
Everest+NIS	.41 oz+.25%	97	96
Everest+NIS+Cleanwave	.41 oz+.25%+13.7 oz	98	98
Everest+NIS+Cleanwave+MCPA ester	.41 oz+.25%+13.7 oz+8.6 oz	98	98
Rimfire+MSO	1.76 oz+1.5 pt	89	60
Rimfire+MSO+Cleanwave	1.76 oz+1.5 pt+13.7 oz	89	75
Silverado+MSO	1.78 oz+1.5 pt	75	53
Silverado+MSO+Cleanwave	1.78 oz+1.5 pt+13.7 oz	85	53
LSD (.05)		3	12

Table 10. Broadleaf Weed Control in Spring Wheat with WideMatch and Starane-NXT

RCB; 4 reps
Planting Date: 4/19/06
Variety: Granger
POST: 5/30/06; Wimu 8-12 in; Wibw 1-4 lf; Voca 8-12 in.
Soil: Clay loam; 4.1% OM; 5.8 pH

Precipitation:
POST: 1st week 0.07 inches
2nd week 0.24 inches

VCRR=Visual Crop Response Rating (0=no injury; 100=complete kill)
Wimu=Wild mustard
Wibw=Wild buckwheat
Voca=Volunteer canola

Comments: Weed management programs that include WideMatch (clopyralid + fluroxypyr) or Starane NXT (bromoxynil + fluroxypyr) were evaluated for broadleaf weed control. Control of volunteer canola was 85% with WideMatch alone, but greater than 90% with all other treatments. Tank-mixtures of WideMatch or Starane NXT with Everest caused some visual crop injury, but there was not a consistent effect on crop yield. WideMatch and chemistries in Starane NXT are listed tank-mix partners on the Everest label.

Treatment	***% VCRR Rate/A***	***Sp Wht % VCRR 6/8/06***	***Sp Wht % Wimu 7/11/06***	***% Voca 7/11/06***	***% Wibw 7/11/06***	***Yield 7/11/06***	***bu/A***
Check	----	0	0	0	0	0	35.8
POSTEMERGENCE							
WideMatch	16 oz	0	0	95	85	98	62.0
WideMatch+MCPA ester	16 oz+13 oz	0	0	99	98	99	63.6
WideMatch+2,4-D ester	16 oz+8.4 oz	0	0	99	99	99	55.6
WideMatch+ Harmony GT 75WG+NIS	16 oz+ .083 oz+.25%	0	0	99	93	99	66.3
WideMatch+ Affinity TM+NIS	16 oz+ .157 oz+.25%	0	0	99	97	99	70.3
WideMatch+Everest	16 oz+.41 oz	24	10	99	93	99	69.8
Starane NXT	13.7 oz	0	0	99	90	99	62.3
Starane NXT+2,4-D ester	13.7 oz+8.4 oz	0	0	99	99	99	60.8
Starane NXT+MCPA ester	13.7 oz+8.5 oz	0	0	99	99	99	67.0
Starane NXT+ Harmony GT 75WG+NIS	13.7 oz+ .083 oz+.25%	0	0	99	96	99	65.9
Starane NXT+Everest	13.7 oz+.41 oz	14	10	99	95	99	53.5
Bronate Advanced	12.8 oz	0	0	99	96	97	71.6
Affinity TM+MCPA ester+NIS	.6 oz+8.6 oz+.25%	0	0	99	99	96	64.2
Affinity Br-Spec+ MCPA ester+NIS	.4 oz+ 8.6 oz+.25%	0	0	99	99	97	62.3
LSD (.05)		2	2	1	2	2	12.8

Table 11. Grass Control in Spring Wheat

RCB; 4 reps
Planting Date: 5/2/06
Variety: Granger
POST: 6/12/06; Sp wht 4-5 lf, 4-6 in; Grft 2-4 lf; 1-3 in; Wioa 2-5 lf; 2-4 in.
Soil: Clay loam; 4.1% OM; 5.8 pH

Precipitation:
POST: 1st week 0.32 inches
2nd week 0.32 inches

Grft=Green foxtail
Wioa=Wild oat

Comments: Puma and Axial programs were evaluated for control of green foxtail and wild oat in spring wheat. Wild oat control with Puma was 90% or less when mixed with Bronate Advanced (bromoxynil + MCPA) or Banvel (dicamba) but greater than 95% with Harmony GT + Starane (thifensulfuron + fluroxypyr) or with no tank-mix partner. These broadleaf herbicides are listed on the Puma label as possible tank-mix partners. Grass control was 99% with the Axial (pinoxaden) treatments.

Treatment	***Rate/A***	***% Grft 7/18/06***	***% Wioa 7/18/06***
Check	----	0	0
POSTEMERGENCE			
Puma	.33 pt	99	98
Puma+Bronate Advanced	.33 pt+.8 pt	96	87
Puma+Harmony GT 75WG+Starane	.33 pt+.3 oz+.33 pt	92	95
Puma+Banvel	.33 pt+2 oz	99	90
Axial+Adigor Adj	.41 pt+7.7 oz	99	99
Axial+Adigor Adj+Banvel	.41 pt+7.7 oz+2 oz	99	99
LSD (.05)		4	5

Table 12. Weed Control in Clearfield Spring Wheat with Clearmax

RCB; 4 reps
Variety: AP603CL
Planting Date: 4/17/06
POST: 5/18/06; Spr Wht 4 lf, 3-4 in;
Wimu 1-3 lf, 1-2 in; Wibw 1-3 lf, 1-2 in; Wioa
Soil: Clay loam; 4.1% OM; 5.8 pH

Precipitation:
POST: 1st week 1.19 inches
2nd week 0.26 inches
VCRR=Visual Crop Response Rating
(0=no injury; 100=complete kill)

VCRR=Visual Crop Response Rating
(0=no injury; 100=complete kill)
Wimu=Wild mustard
Wibw=Wild buckwheat
Wioa=Wild oat

Comments: Weed control was evaluated with Beyond (imazamox) and Clearmax (imazamox+MCPA) in Clearfield spring wheat. Clearmax treatments were created as a combination of Beyond and Rhonox (MCPA). Minimal crop injury was observed. All herbicide programs resulted in complete control of wild mustard, wild buckwheat, and wild oats. However, weed pressure was relatively low as indicated by the minimal yield loss in the untreated check.

Treatment	***Rate/A***	***Spr Wht % VCRR Plant Ht Red 6/5/06***	***Spr Wht % VCRR Leaf Chlorosis 6/5/06***	***Spr Wht % VCRR Plant Ht Red 6/30/06***	***Spr Wht % VCRR Seedhead Deformity 7/21/06***	***Spr Wht % VCRR Plant Maturity 7/21/06***	***% Wimu 6/27/06***	***% Wibw 6/27/06***	***% Wioa 6/27/06***	***Yield bu/A***
Check	----	0	0	0	0	0	0	0	0	52.5
POSTEMERGENCE										
Beyond+NIS+28% N	3 oz+.25%+2.5%	0	0	0	0	0	99	99	99	60.4
Beyond+NIS+28% N	4 oz+.25%+2.5%	1	0	0	0	0	99	99	99	57.7
Beyond+Rhonox+NIS+28% N	3 oz+6 oz+.25%+2.5%	1	0	0	0	0	99	96	99	59.6
Beyond+Rhonox+NIS+28% N	4 oz+8 oz+.25%+2.5%	0	0	0	0	0	99	99	99	60.5
Beyond+Rhonox+ Starane+NIS+28% N	4 oz+8 oz+ 8 oz+.25%+2.5%	0	0	0	0	1	99	99	99	59.4
Beyond+Rhonox+ Buctril 4EC+NIS+28% N	4 oz+8 oz+ 8 oz+.25%+2.5%	1	0	0	0	0	99	99	99	59.8
Beyond+Rhonox+ Clarity+NIS+28% N	4 oz+8 oz+ 2 oz+.25%+2.5%	1	0	0	0	1	99	99	98	59.2
Beyond+Rhonox+ Weedar 64+NIS+28% N	4 oz+8 oz+ 4 oz+.25%2.5%	0	0	1	1	0	99	99	99	57.9
Beyond+Rhonox+ WideMatch+NIS+28% N	4 oz+8 oz+ .6 pt+.25%+2.5%	1	0	1	0	0	99	99	99	57.7
Puma+Bronate Advanced	.67 pt+.8 pt	0	1	1	0	0	99	99	98	57.3
Silverado+Bronate Advanced	1.78 oz+.6 pt	1	0	0	0	0	99	99	99	55.9
Axial+Bronate Advanced+ Adigor Adj	8.2 oz+.8 pt+ 9.6 oz	1	0	0	1	1	99	99	99	56.0
Rimfire+Bronate Advanced+MSO	1.76 oz+.6 pt+1.5 pt	1	0	0	1	1	99	99	99	53.7
LSD (.05)		1	0	1	1	1	0	1	2	6

Table 13. Evaluation of Clearmax Tank-Mix Partners

RCB; 4 reps
Variety: AP603CL
Planting Date: 4/17/06
POST: 5/30/06; Sp wht 4-5 lf, 6-8 in, tillered
Soil: Clay loam; 4.1% OM; 5.8 pH

Precipitation:
POST: 1st week 0.07 inches
2nd week 0.24 inches

VCRR=Visual Crop Response Rating
(0=no injury; 100=complete kill)

Comments: Several tank-mix partners with Clearmax (imazamox + MCPA) were evaluated for Clearfield wheat tolerance. The normal use rate for Clearmax is 12-18 fl oz/A, but higher rates were used in this study to evaluate crop tolerance. Minimal visual wheat injury was noted among the treatments and yield loss did not differ.

Treatment	***Rate/A***	***Sp Wht % VCRR Plant Ht Red 6/5/06***	***Sp Wht % VCRR Leaf Chlorosis 6/5/06***	***Sp Wht % VCRR Plant Ht Red 6/30/06***	***Sp Wht % VCRR Seedhead Deformity 7/21/06***	***Sp Wht % VCRR Plant Maturity 7/21/06***	***Yield bu/A***
Check	----	0	0	0	0	0	50.6
POSTEMERGENCE							
Beyond+NIS+28% N	6 oz+.25%+2.5%	0	1	0	0	0	53.1
Clearmax+ NIS+28% N	24 oz+ .25%+2.5%	1	2	0	0	0	52.7
Clearmax+ Starane+NIS+28% N	24 oz+ 8 oz+.25%+2.5%	2	1	0	0	0	51.4
Clearmax+ Starane+NIS+28% N	24 oz+16 oz+ 16 oz+.25%+2.5%	3	1	1	0	0	52.7
Clearmax+ Buctril 4EC+ NIS+28% N	24 oz+ 8 oz+ .25%+2.5%	0	0	1	0	0	51.3
Clearmax+ Buctril 4EC+ NIS+28% N	24 oz+ 16 oz+ .25%+2.5%	1	1	1	1	0	49.4
Clearmax+ Clarity+NIS+28% N	24 oz+ 2 oz+.25%+2.5%	4	0	1	0	1	50.3
Clearmax+ Clarity+NIS+28% N	24 oz+ 4 oz+.255+2.5%	8	0	2	1	1	48.9
Clearmax+ Weedar 64+ NIS+28% N	24 oz+ 4 oz+ .25%+2.5%	3	1	1	1	1	52.8
Clearmax+ Weedar 64+ NIS+28% N	24 oz+ 8 oz+ .25%+2.5%	3	1	1	0	0	52.4
LSD (.05)		2	1	1	1	1	4

Table 14. Clearmax Application Timing in Spring Wheat

RCB; 4 reps
Variety: AP603LL
Planting Date: 4/17/06
POST: 5/18/06; Spr Wht 4 lf, 3-4 in
POST2: 5/30/06; Spr Wht 4-5 lf, 6-8 in, tillered
Soil: Clay loam; 4.1% OM; 5.8 pH

Precipitation:

POST:	1st week	1.19 inches
	2nd week	0.26 inches
POST2:	1st week	0.09 inches
		0.24 inches

VCRR=Visual Crop Response Rating
(0=no injury; 100=complete kill)

Comments: Clearmax (imazamox+MCPA) was applied when Clearfield spring wheat was 3-4 inches and 6-8 inches to evaluate crop tolerance. The normal use rate of Clearmax is 12-18 fl oz.A, but a higher rate was used in this study to evaluate crop tolerance. A combination of Beyond (imazamox) and Rhonox (MCPA) was applied to simulate Clearmax treatments. Minimal visual crop injury was observed and yield loss did not differ among treatments.

Treatment	***Rate/A***	***Spr Wht % VCRR Plant Ht Red 6/5/06***	***Spr Wht % VCRR Leaf Chlorosis 6/5/06***	***Spr Wht % VCRR Plant Ht Red 6/15/06***	***Spr Wht % VCRR Leaf Chlorosis 6/15/06***	***Spr Wht % VCRR Plant Ht Red 6/30/06***	***Spr Wht % VCRR Seedhead Deformity 7/21/06***	***Spr Wht % VCRR Plant Maturity 7/21/06***	***Yield bu/A***
Check	----	1	0	1	0	0	0	0	47.0
POSTEMERGENCE									
Beyond+NIS+28% N	8 oz+.25%+2.5%	0	0	0	0	1	0	0	46.6
Rhonox+NIS+28% N	16 oz+.25%+2.5%	0	0	1	0	0	0	0	46.9
Clearmax+NIS+28% N	18 oz+12 oz+.25%+2.5%	0	0	0	0	0	0	0	46.7
Clearmax+NIS+28% N	24 oz+16 oz+.25%+2.5%	0	0	0	0	1	0	0	47.2
Clearmax+MSO+28% N	24 oz+16 oz+1%+2.5%	0	0	1	0	1	1	0	45.3
POSTEMERGENCE 2									
Beyond+NIS+28% N	8 oz+.25%+2.5%	1	0	0	0	0	0	0	47.5
Rhonox+NIS+28% N	16 oz+.25%+2.5%	2	0	0	0	0	0	0	47.1
Clearmax+NIS+28% N	18 oz+12 oz+.25%+2.5%	2	1	0	0	0	0	0	47.1
Clearmax+NIS+28% N	24 oz+16 oz+.25%+2.5%	0	0	0	0	1	0	0	46.9
Clearmax+MSO+28% N	24 oz+16 oz+1%+2.5%	2	0	1	0	0	0	0	44.7
LSD (.05)		1	1	2	0	1	1	0	1.7

Table 15. Millet Crop Response with Callisto

RCB; 4 reps
Planting Date: 6/8/06
Variety: Gem X Diamond
PRE: 6/8/06
POST: 6/26/06; Pearl millet 1-3 in
Soil: Silty clay loam; 3.2% OM; 6.3 pH

Precipitation:

PRE:	1st week	0.39 inches
	2nd week	0.38 inches
POST:	1st week	0.71 inches
	2nd week	0.05 inches

VCRR=Visual Crop Response Rating
(0=no injury; 100=complete kill)

Comments: Callisto (mesotrione) was evaluated for millet tolerance and weed control for possible future registration for use in millet. No millet injury was observed with the use of Callisto at the high rate (6 oz/A) applied pre-emergence. Some millet chlorosis and bleaching was observed with post-emergence applications of Callisto. However, these injury symptoms were not observed later in the season.

Treatment	***Rate/A***	***Millet % VCRR Chlorosis 7/7/06***	***Millet % VCRR 8/4/06***	***Millet % VCRR 8/31/06***
Check	----	0	0	0
PREEMERGENCE				
Callisto	3 oz	0	0	0
Callisto	6 oz	0	0	0
POSTEMERGENCE				
Callisto+NIS	2 oz+.25%	4	0	0
Callisto+NIS	3 oz+.25%	9	0	0
Callisto+2,4-D amine+NIS	2 oz+8.4 oz+.25%	5	0	0
Callisto+2,4-D amine+NSI	3 oz+8.4 oz+.25%	6	0	0
2,4-D amine+NIS	8.4 oz+.25%	0	0	0
2,4-D amine	16.2 oz	0	0	0
Callisto+COC	3 oz+1%	6	0	0
Callisto+2,4-D amine	3 oz+8.4 oz	4	0	0
Callisto+2,4-D amine	3 oz+16.2 oz	3	0	0
LSD (.05)		3	0	0

Table 16. Field Pea Demonstration

RCB; 4 reps
Planting Date: 4/25/06
Variety: Salute
PPI/PRE: 4/25/06
POST: 5/30/06; Field pea 5-7 in; Colq 2-5 in; KOCZ 2-3 in; Wimu 4-8 in.
Soil: Clay loam; 4.1% OM; 5.8 pH

Precipitation:

PPI/PRE:	1st week	0.96 inches
	2nd week	0.01 inches
POST:	1st week	0.07 inches
	2nd week	0.24 inches

Colq=Common lambsquarter
KOCZ=Kochia
Wimu=Wild mustard

Comments: Field pea tolerance and weed control was evaluated among several herbicide programs. Few grass species were present to evaluate grass control.

Pre-plant incorporated: Treatments resulted in approximately 80-90% common lambsquarters control and approximately 90% kochia control. Wild mustard control was greatest with the Prowl H_2O treatments. Sonalan (ethalfluralin) caused approximately 15% stand loss, which was greater than the other PPI treatments.

Pre-emergence: The greatest weed control resulted from applications of Spartan (sulfentrazone), Pursuit 2L (imazethapyr), or Dual II Magnum + Sencor DF (S-metolachlor + metribuzin). Sencor applied alone at 0.5 lb/A resulted in 13% pea stand loss, which was greater than the other treatments.

Post-emergence: Treatments with Basagran (bentazon) or Thistrol (MCPB) provided the greatest weed control.

Pre-emergence followed by post-emergence: Both treatments resulted in good weed control, but Sencor caused approximately 17% field pea stand reduction.

Treatment	***Rate/A***	***Field Pea Stand Loss 6/9/06***	***% Colq 7/20/06***	***% KOCZ 7/20/06***	***% Wimu 7/20/06***
Check	----	0	0	0	0
PREPLANT INCORPORATED					
Treflan	2 pt	0	77	90	13
Sonalan	3 pt	15	85	90	30
Prowl H_2O	2.75 pt	0	88	92	53
Prowl H_2O+Dual II Magnum	2.75 pt+1.67 pt	2	83	88	62
PREEMERGENCE					
Command 3ME	1.3 pt	0	70	93	72
Dual II Magnum	1.67 pt	0	85	71	39
Sencor DF	.5 lb	13	87	93	85
Spartan 4F	6 oz	0	96	97	88
Aim	1 oz	0	77	93	87
Pursuit 2L	3 oz	0	96	93	99
Dual II Magnum+Sencor DF	1 pt+.33 lb	2	89	96	96

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Treatment	***Rate/A***	***Field Pea Stand Loss 6/9/06***	***% Colq 7/20/06***	***% KOCZ 7/20/06***	***% Wimu 7/20/06***
POSTEMERGENCE					
Pursuit 2L+NIS	3 oz+.25%	0	80	80	99
Raptor+NIS	4 oz+.25%	0	63	74	99
Raptor+Basagran+NIS	4 oz+2 pt+.25%	0	97	96	99
Basagran+NIS	2 pt+.25%	0	96	96	99
Thistrol MCPB	6 pt	0	97	89	88
Assure II+COC	8 oz+1 qt	0	0	0	0
Poast+COC	1 pt+1 qt	0	0	0	0
Poast Plus+Basagran+COC	1.6 pt+2 pt+1 qt	0	96	96	99
PREEMERGENCE & POSTEMERGENCE					
Spartan 4F&Poast+COC	6 oz&1 pt+1 qt	0	92	97	92
Sencor DF&Assure II+COC	.5 lb&8 oz+1 qt	17	86	95	87
LSD (.05)		3	12	11	13

Table 17. Weed Control in Flax

RCB; 4 reps
Variety: Selby
Planting Date: 4/25/06
PRE: 4/25/06
POST: 5/30/06; Flax 3-4 in; Colq 2-4 in, 2-6 lf; Wibw 1-2 in, 2-4 lf
Soil: Silty clay loam; 3.2% OM; 6.3 pH

Precipitation:

PRE:	1st week	0.96 inches
	2nd week	0.01 inches
POST:	1st week	0.07 inches
	2nd week	0.24 inches

VCRR=Visual Crop Response Rating (0=no injury; 100=complete kill)
Colq=Common lambsquarter
Wibw=Wild buckwheat

Comments: Several registered and non-registered herbicides were evaluated for weed control and flax tolerance. Many of the pre-emergence herbicides resulted in minimal visual flax injury and resulted in marginal broadleaf weed control. Pre-emergence applications of Spartan (sulfentrazone) did not injure the flax and resulted in 91-94% lambsquarters control and 80-83% wild buckwheat control. Post-emergence applications of MCPA ester, Curtail M (clopyralid+MCPA), or Callisto (mesotrione) resulted in more than 14% flax stunting at the beginning of June. Applications of Stinger (clopyralid), Basagran (bentazon), or Buctril (bromoxynil) resulted in minimal flax injury and resulted in more than 82% common lambsquarters control. Wild buckwheat control was lowest (53%) in the MCPA treatment.

Wibw Treatment	***Rate/A***	***Flax % VCRR Stunt 6/9/06***	***Flax % VCRR Chlorosis 6/9/06***	***Flax % VCRR Delay 7/18/06***	***% Colq 8/4/06***	***% 8/4/06***
Check	----	0	0	0	0	0
PREEMERGENCE						
Dual II Magnum	1 pt	0	0	0	43	43
Outlook	10 oz	5	0	0	48	45
Prowl H_2O	3 pt	6	0	0	59	43
Micro-Tech	1.5 qt	0	0	0	33	35
PREEMERGENCE & POSTEMERGENCE						
Spartan 4F&Select+COC	4 oz&6 oz+1%	0	0	0	94	80
Spartan 4F&Assure II+COC	4 oz&6 oz+1%	0	0	0	94	83
Spartan 4F&Poast+COC	4 oz&1 pt+1%	0	0	0	91	81
POSTEMERGENCE						
MCPA ester+Select+COC	1 pt+6 oz+1%	14	0	1	97	53
Buctril+Select+COC	1 pt+6 oz+1%	3	5	0	92	90
Basagran+Select+COC	1 pt+6 oz+1%	0	0	0	85	68
Stinger+Select+COC	.33 pt+6 oz+1%	0	0	0	82	90
Curtail M+Select+COC	2.33 pt+6 oz+1%	19	1	2	98	99
Callisto+Select+COC	3 oz+6 oz+1%	21	24	4	95	83
LSD (.05)		5	4	.5	14	9

Table 18. Callisto - Flax Tolerance

RCB; 4 reps
Planting Date: 4/25/06
Variety: Selby
PRE: 4/25/06
POST: 5/30/06; Flax 3-4 in; Colq 2-4 in, 2-6 lf; Wibw 1-3 lf, 1-3 in
Soil: Silty clay loam; 3.2% OM; 6.3 pH

Precipitation:
PRE: 1st week 0.96 inches
2nd week 0.01 inches
POST: 1st week 0.07 inches
2nd week 0.24 inches

VCRR=Visual Crop Response Rating (0=no injury; 100=complete kill)
Colq=Common lambquarters
Wibw=Wild buckwheat

Comments: Callisto (mesotrione) was evaluated for flax tolerance and weed control for possible future registration for use in flax. Some flax injury was noted with pre-emergence applications of Callisto at 12 oz/A, which would be twice the high rate recommended for corn. Visual leaf injury and flax stunting was greater from tank-mixtures of Callisto with Buctril (bromoxynil) than with MPCA amine or without a tank-mix partner. However, flax yield did not differ among the treatments.

Treatment	***Rate/A***	***Flax % VCRR Stunt 6/9/06***	***Flax % VCRR Chlorosis 6/9/06***	***Flax % VCRR Burn 6/9/06***	***Flax % VCRR Stunt 6/16/06***	***Flax % VCRR Chlorosis 6/16/06***	***Flax % VCRR Stunt 6/27/06***	***Flax Maturity Delay (days) 7/5/06***	***Flax Maturity Delay (days) 7/18/06***	***% Colq 7/18/06***	***% Wibw 7/18/06***	***Yield bu/A***	
Check	----	0	0	0	0	0	0	0	0	0	16		
PREEMERGENCE													
Callisto	3 oz	3	3	0	0	0	0	0	0	97	75	25	
Callisto	6 oz	3	3	0	3	0	0	0	0	98	78	24	
Callisto	12 oz	20	5	0	18	2	17	2	1	98	88	19	
POSTEMERGENCE													
Callisto+NIS	2 oz+.25%	6	13	0	7	3	0	2	0	99	94	24	
Callisto+NIS	3 oz+.25%	8	16	0	10	10	0	1	0	99	94	24	
Callisto+COC	3 oz+1%	20	23	11	15	13	10	3	0	98	97	21	
Callisto+MCPA ester+NIS	2 oz+8.6 oz+.25%		15	8	0	10	3	2	3	0	99	96	25
Callisto+MCPA ester+NIS	3 oz+8.6 oz+.25%		13	8	0	10	5	0	3	0	99	97	26
Callisto+MCPA ester+COC	3 oz+8.6 oz+1%		19	11	0	13	5	7	4	0	98	97	24

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Treatment	*Rate/A*	*% VCRR Stunt 6/9/06*	*Flax % VCRR Chlorosis 6/9/06*	*Flax % VCRR Burn 6/9/06*	*Flax % VCRR Stunt 6/16/06*	*Flax % VCRR Chlorosis 6/16/06*	*Flax % VCRR Stunt 6/27/06*	*Flax Delay (days) 7/5/06*	*Flax Maturity Delay (days) 7/18/06*	*Flax Maturity % Colq 7/18/06*	*% Wibw 7/18/06*	*Yield bu/A*	
POSTEMERGENCE													
Callisto+Buctril+NIS	2 oz+8 oz+.25%		26	20	24	22	10	17	4	4	96	97	21
Callisto+Buctril+NIS	3 oz+8 oz+.25%		20	19	19	18	8	13	5	3	98	98	23
Callisto+Buctril+MCPA ester+NIS	2 oz+8 oz+8.6 oz+.25%		23	20	10	3	17	8	8	5	3	99	97
Callisto+Buctril+MCPA ester+NIS	3 oz+8 oz+8.6 oz+.25%		21	29	21	8	23	10	18	5	5	99	98
Buctril+NIS	16 oz+.25%		4	4	0	3	2	0	0	0	96	94	24
MCPA ester+NIS	8.6 oz+.25%		6	0	0	2	0	0	0	0	98	71	23
LSD (.05)		5	4	3	4	3	5	1	1	2	7	5	

Table 19. Canola Herbicide Tolerance and Weed Control

RCB; 3 reps
Variety: DK 3455RR
Planting Date: 4/25/06
PRE: 4/25/06
POST: 5/30/06; Canola 4 lf, 4 in; Colq 2-5 in.
POST2: 6/12/06; Canola 10 in
Soil: Clay loam; 4.1% OM; 5.8 pH

Precipitation:

PRE:	1st week	0.96 inches
	2nd week	0.01 inches
POST:	1st week	0.07 inches
	2nd week	0.24 inches
POST2:	1st week	0.32 inches
	2nd week	0.32 inches

VCRR=Visual Crop Response Rating
(0=no injury; 100=complete kill)
Colq=Common lambsquarter

Comments: Several non-registered herbicides were evaluated for weed control and canola tolerance. Additional herbicide chemistries may be needed to control some weeds that may escape Roundup treatments or cause yield loss due to early-season competition. High rates of Outlook (dimethenamid-p) at 20 oz/A or Surpass (acetochlor) at 3 pt/A caused more than 10% visual crop injury. Among the pre-emergence treatments, canola yield was lowest in the Surpass treatments. In the post-emergence treatments, canola yield was reduced by approximately 30% with a late application of Roundup compared to an earlier application which may have been due to early-season weed competition.

Treatment	***Rate/A***	***% VCRR 6/9/06***	***% Colq 8/3/06***	***Yield lb/A***
Check	----	0	0	1314
PREEMERGENCE				
Prowl H_2O	3 pt	0	91	1362
Command 3ME	1 pt	0	70	1325
Define SC	10 oz	0	60	1327
Outlook	20 oz	10	85	1255
Outlook	10 oz	0	83	1329
Intrro	2 qt	0	82	1413
Dual II Magnum	1.6 pt	0	78	1436
Dual II Magnum	.8 pt	0	73	1381
Surpass	3 pt	18	87	1136
Surpass	1.5 pt	2	78	1192
PREEMERGENCE & POSTEMERGENCE				
Dual II Magnum& Roundup WeatherMax+AMS	.8 pt& 22 oz+2.5 lb	0	99	1596
POSTEMERGENCE				
Roundup WeatherMax+AMS	22 oz+2.5 lb	0	99	1597
POSTEMERGENCE 2				
Roundup WeatherMax+AMS	22 oz+2.5 lb	0	99	1135
LSD (.05)		3	9	163

Table 20. Postemergence Weed Control in Canola

RCB; 3 reps
Variety: DK 3455RR
Planting Date: 4/25/06
POST: 6/12/06; Canola 10 in.
Soil: Clay loam; 4.1% OM; 5.8 pH

Precipitation:
POST: 1st week 0.32 inches
2nd week 0.32 inches

VCRR=Visual Crop Response Rating
(0=no injury; 100=complete kill)

Comments: Several growth regulator tank-mix partners with Roundup (glyphosate) were evaluated for canola tolerance. Stinger is the only growth regulator herbicide registered for use on canola. MCPA, Starane (fluroxypyr), and Clarity (dicamba) caused significant canola stunting and delayed flowering.

Treatment	***Rate/A***	***VCRR Delay (days) 7/18/06***	***% VCRR Stunting 7/18/06***
Check	----	0	0
POSTEMERGENCE			
Roundup WeatherMax	15 oz	0	0
Roundup WeatherMax+AMS	15 oz+2.5 lb	0	0
Roundup WeatherMax+Starane+AMS	15 oz+5 oz+2.5 lb	5	25
Roundup WeatherMax+Stinger+AMS	15 oz+2 oz+2.5 lb	2	0
Roundup WeatherMax+Clarity+AMS	15 oz+3 oz+2.5 lb	5	30
Roundup WeatherMax+MCPA amine+AMS	15 oz+6 oz+2.5 lb	5	85
Roundup WeatherMax+MCPA amine+AMS	15 oz+3 oz+2.5 lb	5	55

Fertilizer Influence on Soil Tests and Corn Yield, Watertown, 2006

Jim Gerwing, Ron Gelderman, Anthony Bly, and Allen Heuer

Introduction

Soil testing research has shown that knowledge of soil test levels can improve the profitability of fertilizer use. Profits increase if more fertilizer is used when soil test levels are low and less or no fertilizer is used when test levels are high. It is still a common practice, however, to apply fertilizer without a current soil test. Frequently all the major nutrients (N P K) and sometimes zinc are used. This experiment was initiated to demonstrate the effects of applying P, K and Zn regardless of soil test. The objective is to demonstrate soil testings' ability to predict crop response to fertilizer and fertilizer influence on soil tests. The intent is to continue the experiment on the same location at the NE Experiment Station for a number of years.

Materials and Methods

The site selected at the NE Experiment Station is a nearly level silty clay loam soil (Brookings) that is common to North East South Dakota. The experiment was initiated in 1996 with the same fertilizer nutrients applied to the same plots each year.

The check fertilizer treatment in this experiment received all fertilizer nutrients (160 lb/a N, 40 lb/a P_2O_5, 50 lb/a K_2O, 5 lb/a Zn). Each subsequent treatment received three of the four nutrients allowing a comparison of the "full" fertilizer program to a treatment lacking one individual nutrient (Table 1). Nutrient rates were the same each year except nitrogen. Fertilizer sources used were urea (46-0-0), super phosphate (0-46-0), potassium chloride (0-0-60) and zinc sulfate (35% Zn). Fertilizer was broadcast and incorporated by disking prior to planting corn. Plot size was 15 feet by 60 feet. Each treatment was replicated four times. The previous crop (2005) was wheat. The corn in 2006 was harvested with a small plot combine.

Results and Discussion

Soil test results from samples taken October 25, 2005, are listed in Table 2. The nitrate soil test was very low (10 and 16 lb/a 2 ft) for both the N fertilized and unfertilized plots. The 2005 wheat crop (50 bu/a) essentially removed most of the N applied in 2005. The 40 pounds of phosphorus and 50 pounds of potassium applied each year since 1996 raised the phosphorus soil test from 3 ppm in the check to 16 ppm and the potassium test from 155 ppm in the check to 197 ppm. Five pounds of zinc applied each year since 1996 raised the zinc soil test from 0.91 to 12.6 ppm.

Corn yields were severely limited in 2006 due to dry and hot conditions in July and August. The fall fertilizer treatment receiving N, P, K and Zn yielded only 69 bu/a (Table 1). Table l also shows that leaving off only the nitrogen reduced yield 50 bu/a, resulting in a yield of only 19 bu/a. Severe yield reductions caused by N deficiency occur in very dry years such as 2006 due to lower than average N mineralization rates and very inefficient N update by drought stressed roots. In addition this site had very low residual nitrate (less than 20 lb/a) following the 2005 wheat crop. The treatment without phosphorus also had significantly lower yields at 34 bu/a compared to the "check" at 69 bu/a. A yield reduction was expected for this treatment since the P soil test was only 3 ppm which is in the very low category compared to the P fertilized

treatment which was in the high category (16 ppm). This 50% reduction in yield due to P deficiency was larger than expected and was likely due to inefficient root activity because of the drought conditions this year. Removing fertilizer K or Zn from these plots did not reduce yield. Soil test for these nutrients were in the high range and therefore not applying them was not expected to reduce yield.

This site will be rotated to soybeans in 2007. Similar fertilizer treatments (except N) will be applied to the same plots. Yield and soil tests from the past years of this study can be found in the 1996 to 2005 NE Farm Progress Reports or in the 1996 to 2005 SDSU Plant Science Department Soil/Water Science Research Annual Report, TB No. 99.

Support for this study was provided by various sources including the Ag Experiment Station, Plant Science Dept, Cooperative Extension Services and the SDSU Soil Testing Lab.

Table 1. Fertilizer Treatments and Corn Yield, North East Research Farm, Watertown, 2006

Fertilizer[1]				Corn Yield
N	P_2O_5	K_20	Zn	
- - - - - - - - - - lb/a - - - - - - - - - -				bu/a
160	40	50	5	69 a
0	40	50	5	19 b
160	0	50	5	34 b
160	40	0	5	69 a
160	40	50	0	60 a
Pr > F				< 0.01
CV%				15
LSD .05				11.6

[1] P, K, Zn applied each year 1996-2006, N rate was 50, 95, 50, 75, 115, 50, 60, 130, 50, 75, 160 lb/a for years 1996-2006.

Table 2. Soil Tests for Fertilizer Experiment at NE Research Farm, Watertown, 2006.

Soil Test[1]	Fertilized[2]	Unfertilized
Nitrate-N, lb/a 2 feet	10	16
Phosphorus, ppm Olson	16	3
Potassium, ppm	197	155
Zinc, ppm	12.6	0.91
pH	6.4	---
Organic Matter, %	3.1	---
Salt, mmhos/cm	0.3	---

[1] Sampled 10/25/05

[2] each year since 1996

Nitrogen Rate and Sulfur Influence on Corn Yields, Watertown, 2006

J. Gerwing, R. Gelderman, A. Bly, and A. Heuer

Objective

Nitrogen prices continue to increase prompting renewed questions about the most economical rate for corn. Observations in recent years have shown sulfur deficiencies have become more common and more severe where higher nitrogen rates have been applied. The objectives of this experiment were to determine the nitrogen rate needed for maximum corn yield and the influence of nitrogen rate on response to added sulfur.

Materials and Methods

Site for this experiment was on the Watertown experiment farm. The site had soybeans as a previous crop. It was chiseled in the fall and field cultivated prior to planting in spring. Nitrogen rates were in 35 lb increments from 0 to 140 lb/a (table 1). In addition to the N rates, 35 lbs sulfur per acre was applied with 70 and 140 lb nitrogen rates. Nitrogen was broadcast on the surface as ammonium nitrate shortly before planting. Part of the nitrogen in the sulfur treatments was supplied by the ammonium sulfate. All treatments were replicated four times. Fall 2005 soil sampling of the site showed a 2 foot nitrate soil test of 28 lb/a. Spring sampling prior to planting showed it had increased to 52 lb/a. Organic matter at the site is 3.7%.

Results and Discussion

Extremely dry and hot conditions limited yields to an average of 73 bushels per acre (Table 1). Nitrogen had no significant influence on yield, likely due to the low demand for N from the low yield and nitrogen credit provided by the previous soybean crop. Sulfur added to the 70 and 140 lb nitrogen treatment had no effect on yield. Low yields may have been a factor but more likely the lack of a sulfur response was due to the very high spring sulfur soil test (40 lb/a 2 ft). No sulfur would have been recommended by the SDSU soil testing lab. Nitrogen rate plots were sampled to a depth of 2 feet in 1 foot increments on October 30th to determine nitrogen carryover. Nitrate nitrogen soil tests increased with nitrogen rate from a low of 56 lb/a 2 ft where no nitrogen had been applied to 204 lb/a 2 feet in the 140 lb N treatment. The direct correlation between nitrogen rate and soil nitrate carryover was expected due to the dry conditions and low yields. Producers in the drought areas of South Dakota in 2006 likely have similar carryover levels and soil sampling to confirm it will allow them to reduce their nitrogen rate for 2007.

Acknowledgments: Support for this study came from various sources including the Ag Experiment Station, Plant Science Dept, Extension Service and the SDSU Soil Testing Lab.

Table 1. Nitrogen and Sulfur Influence on Corn Yield, Watertown, 2006.

Fertilizer Treatment Nitrogen + Sulfur	Corn Yield
lb/a	bu/a
1. 0	69
2. 35	78
3. 70	69
4. 70 + 35	79
5. 105	68
6. 140	80
7. 140 + 35	79
Pr > F	0.60
CV %	18.3
LSD .05	NS
Orthogonal Contrast, Sulfur Trts. 3+6 vs. 4+7	0.45
Soil Tests (spring)	
NO_3-N, lb/a 2 ft	52
SO_4-S, lb/a 2 ft	40
OM %, 0-6 in.	3.7

Table 2. Nitrogen Rate Influence on Fall Nitrate Soil Test Level, Watertown 2006

Nitrogen Rate[1,2]	Depth, inches		
	0-12	12-24	Total
lb/a	----------lb/a NO_3-N[3]----------		
0	32	24	56
35	84	32	116
70	96	40	136
105	108	40	148
140	152	52	204

[1]Spring 2006 NO_3-N soil test = 52 lb/a, soybean previous crop
[2]Avg Corn Yield = 73 bu/a, N rate on yield was NS
[3]Sampled 10/30/06

PERFORMANCES OF TRANSGENIC CORN (BT-CORN BORER, BT-ROOTWORM, AND STACKED BT), SEED TREATMENTS, AND INSECTICIDES UNDER DROUGHT CONDITIONS

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INTRODUCTION

Transgenic Bt corn hybrids have been grown in SD since 1996. Our continuing research on the performances of Bt corn hybrids have indicated that Bt corn will do very well if corn borers are present on the field in economic numbers (Catangui and Berg 2002, Catangui 2003). However, complete immunity to insects does not necessarily translate to higher corn yields at harvest. During periods of low or nonexistent infestations by the target insects, the benefit of growing Bt corn with its accompanying higher seed cost may not be realized. This past growing season (2006), we had the opportunity to further test the performances of Bt corn this time under severe drought conditions with moderate corn borer infestation levels. We report here some very interesting data that indicate that "over protected" Bt corn plants may not necessarily be the best performer during drought.

The Northeast Farm has been unique in our Bt-corn research due to the fact that the so-called univoltine corn borers occur in the area (Catangui 2000). Univoltine corn borers accumulate and stay within the corn stalks and ears through the season, overwinter in the stubbles, then turn into moths in the spring of the following year. There is only one peak moth flight per season that occurs in July.

MATERIALS AND METHODS

The research site was tilled conventionally; on first-year corn following soybean. Corn seeds were planted using a precision planter on May 5, 2006. Each treatment was replicated 4 times and assigned in a randomized complete block fashion on each experimental unit. Each experimental unit was composed of four rows (20 ft. long) spaced 30 inches apart. The insecticides were applied on July 13. One row per plot was destroyed and dissected for corn borer injuries on September 11-25. Two inner rows were kept intact then harvested at the end of season (November 8). Ten consecutive plants on one row were dissected before harvest using a curved knife and examined for corn borer larval tunnels, tunnel length, and live corn borer larvae in the stalk, ear shank, and ear.

RESULTS AND DISCUSSION

Yield. DKC 46-22 expressing the stacked YieldGard Plus gene yielded 14 bushels less than the untreated DKC 46-28 (Fig. 1A). In fact, all of the Bt corn hybrids underperformed during the drought of 2006. Both corn hybrids expressing the YieldGard Corn Borer and YieldGard Plus genes were nearly devoid of European corn borer larval injuries. The field was on first-year corn after a soybean crop so we did not expect for the YieldGard Rootworm gene or seed treatments, alone or in combination, to improve yield. A yield advantage of 10 bushels per acre was observed in conventional corn sprayed with a low rate of Baythroid in July (Fig. 1A).

Stalk injury. Corn borers were able to infest about 50% of the unprotected corn (Fig. 1B). Ironically, the corn hybrid that was completely free of corn borer injury also yielded the least. Results from this study do indicate that drought stress may affect the performance of transgenic Bt corn hybrids exposed to univoltine corn borers in SD. Catangui (2003) also observed apparent underperformance in some transgenic Bt corn hybrids during years of low or nonexistent corn borer infestation levels.

REFERENCES CITED

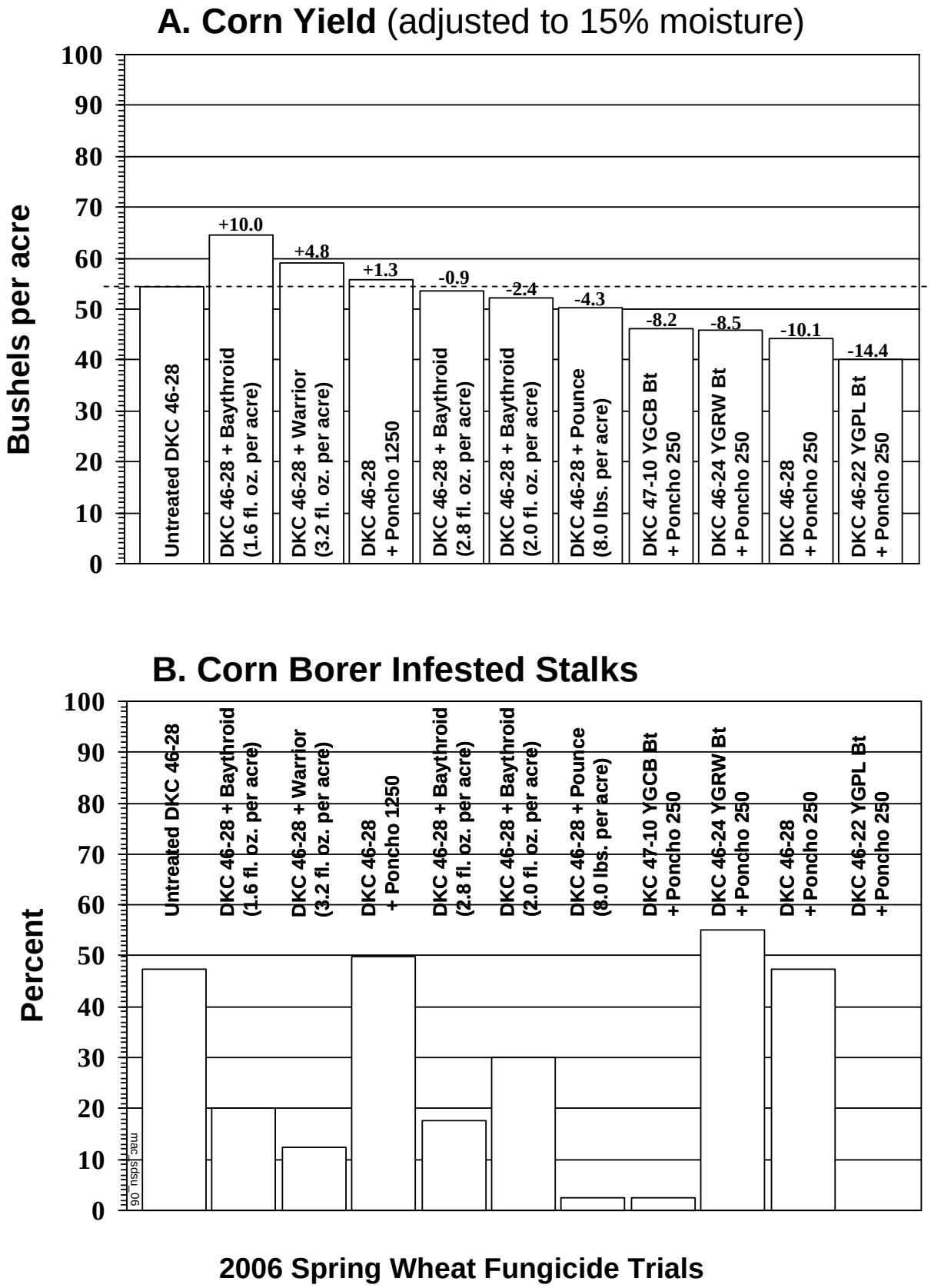
Catangui, M. A. 2000. European corn borer in South Dakota. South Dakota State University, Brookings, SD (http://plantsci.sdstate.edu/ent/ecb_mgmt_SD.htm).

Catangui, M. A. 2005. Corn borer moth flights in South Dakota. South Dakota State University, Brookings, SD (http://plantsci.sdstate.edu/ent/ecb/SD_ECB_2005.htm).

Catangui, M. A. 2003. Transgenic *Bacillus thuringiensis* corn hybrid performance against univoltine ecotype European corn borer (Lepidoptera: Crambidae) in South Dakota. J. Econ. Entomol. 96: 957-968.

Catangui, M. A., and R. K. Berg. 2002. Comparison of *Bacillus thuringiensis* corn hybrids and insecticide-treated isolines exposed to bivoltine European corn borer (Lepidoptera: Crambidae) in South Dakota. J. Econ. Entomol. 95: 155-166.

Fig. 1. Performances of Bt-corn and various insecticides against the univoltine ecotype European corn borer at the NE Research Station during the 2006 season



K. Ruden, S. Thompson, M. Draper and K. Glover

Introduction:

Fusarium head blight (scab or FHB) has been a recurring problem in winter and spring wheat, durum, and barley grown in South Dakota since the severe epidemic of 1993. Scab outbreaks have been periodic and localized since that time. A small and localized outbreak occurred in the NE South Dakota in 2004 and a more widespread epidemic developed in 2005 causing extensive damage to winter wheat in the southeastern and south central counties of SD. Scab management requires a multi-faceted approach including cultural methods and variety selection. Fungicides alone have only provided suppression of FHB. It appears at this time that even after the release of highly resistant crop varieties, fungicides will be a component in managing this disease and minimizing crop losses. Fungicide applications late in crop development, approaching flowering, have been shown to provide the best control of scab. At the same time, they often provide the optimal control of leaf disease over application at flag leaf emergence.

Additionally, several fungi cause foliar diseases on wheat every year and fungicides are more efficacious at their control than against FHB. These diseases include leaf rust (*Puccinia recondita*) and stripe rust (*Puccinia striiformis* f. sp. *tritici*) and the residue-borne diseases tan spot (*Pyrenophora tritici-repentis*) and the Septoria complex (*S. tritici*, *S. avenae*, and *S. nodorum*). Timing of fungicide applications varies, as does the period at which the diseases attack, and as such all fungicide applications should not be expected to provide maximum suppression of all diseases.

Materials and Methods:

Hard red spring wheat was planted in several South Dakota locations in the northeastern quarter of the state; the Northeast Research Station, (NE Farm), on-station in Brookings, SD (Brookings), and in a cooperator's field near Groton, SD (Groton).

The trial was conducted on two red hard spring wheat cultivars, Briggs and Ingot. Trials were planted in a factorial randomized complete block design where factor A was the wheat variety and factor B was fungicide treatment variety. Trials were replicated four times for Study 1 (Table 2) and replicated six times for Study 2 (Tables 3-5) at Brookings, NE Farm and Groton. Fungicide treatments (Tables 2-5) were applied at various growth stages from three to five leaf stage to initiation of flowering. Most fungicides were applied with Induce, a non-ionic surfactant (NIS). Brookings plots were misted from 6:00pm to 8:00am for ten days following anthesis to enhance the environment for FHB development. The Brookings site was also inoculated with *Fusarium graminearum* isolate Fg4 colonized corn grain to enhance infection. With the addition of the colonized corn and the mist irrigation, disease pressure was optimized.

At the soft dough stage of crop development, plots were evaluated for leaf diseases, FHB incidence, FHB head severity, and FHB field severity, Fusarium damaged kernels (FDK), deoxynivalenol (DON), grain yield, test weight, and protein data were collected after harvest. Various ratings were used for leaf disease. Whole plot ratings evaluated the relative amount of green tissue remaining on a 0-9 scale where completely green tissue was rated as a zero and fully necrotic plants were

rated a nine. Ideally, leaf area assessments are used to estimate the percentage of the flag leaf that is necrotic due to total leaf diseases and leaf rust alone. Specific information on dates of planting and treatment dates is listed in Table 1. Fungicide treatments are listed in Tables 2-5. Due to the volume of data generated, only leaf rust infection on the flag leaf, yield, and test weight are reported in Tables 2 and 3.

Table 1: Dates of planting, fungicide applications, plot rating, and harvest for wheat fungicide trials in northeastern South Dakota in 2006.

Activity	Crop stage		Date/Location (2006)	
	Descriptive	Feekes growth stage	Brookings	Groton
Planting	-	-	5/18	4/26
Fungicide Applications	Jointing	2	6/15	6/2
	Stem elongation	5	6/23	6/13
	Flag leaf emergence	8-9	6/29	6/20
	Completely Headed	10.5	7/3	6/25
	Anthesis	10.51	7/6	6/29
Rating	Soft Dough	11.2	7/27	7/20
Harvest	Mature	11.4	8/30	8/9

Results and Discussion:

Fusarium head blight development was scant in 2006, even when inoculation and mist irrigation was added. Under those supplemented conditions at Brookings, only about 5% scab developed on the more susceptible variety Briggs. By choosing a more resistant variety, Ingot, FHB was reduced to 1.3% total disease.

Leaf rust was late arriving at most of the study locations. In study one (Table 2), most products gave good rust control if applied late in crop development (after flag leaf emergence). There was no advantage in applying multiple fungicide applications. A single application as late as possible in the growing season gave very good leaf rust control. Even when good control resulted, a yield response was not apparent when Briggs and Ingot were analyzed together in Table 2. However, in study two (Table 3), the differences were more apparent, and a yield response did result. When Briggs and Ingot were analyzed separately, it became apparent that there is an advantage in knowing the characteristics of the variety to understand what kind of a response a fungicide may provide. When a leaf disease-susceptible variety is treated with a fungicide under disease conditions, the chances of seeing a response in yield, and other quality characteristics increases, as we see with Ingot. However the same results are not apparent with Briggs, a leaf disease-resistant variety.

Fungicide treatments in study one that were applied early in crop development (jointing) without being followed by a later treatment, typically did not have adequate residual protection long enough into the season to significantly reduce leaf rust severity at soft dough or increase yield at maturity. When early treatments are made, they must be followed with a second application later in the season to increase the duration of residual protection if the season continues to favor disease development. Late season applications work well if the producer plans to only apply fungicide once.

Due to the very hot and dry conditions at NE Research Farm, crop development was rapid and uneven, further contributing to the exclusion of those data from this report.

Acknowledgements:

This research was supported in part by grants from the SD Wheat Commission and the US Wheat and Barley Scab Initiative.

Table 2: Responses from Study one of leaf rust disease, yield, and test weight of grain on two spring wheat cultivars and several fungicide treatments applied at various crop stages at two northeastern South Dakota locations.

		Crop	Leaf Rust (% of flag leaf)		Yield (bu/A)		Test Weight (lb/bu)	
Fungicide	Rate	Stage[1]	Brookings	Groton	Brookings	Groton	Brookings	Groton
Untreated	N/A	N/A	8.13	3.25	41.66	50.72	53.42	61.66
Quilt	7 fl oz/A	5	8.00	2.78	46.05	50.07	52.83	61.78
Quilt	14 fl oz/A	9-10	**3.38**	2.60	44.54	50.64	52.63	61.88
Quilt	14 fl oz/A	10.5	**0.50**	0.75	45.56	52.72	54.13	61.61
Quilt + Quilt	7 fl oz/A + 14 fl oz/A	5 + 10.5	**0.00**	0.83	48.38	52.18	53.63	62.00
Quilt + Tilt	7 fl oz/A + 4 fl oz/A	5 + 10.5	**0.88**	2.40	46.50	50.94	54.10	61.84
Quilt + Folicur	7 fl oz/A + 4 fl oz/A	5 + 10.51	**0.25**	1.55	45.21	51.53	54.19	62.13
Exp. A	1.5 fl oz/A	2	10.13	2.93	44.41	50.54	54.63	61.07
Exp. A	2 fl oz/A	2	5.25	4.15	46.08	52.38	53.84	61.41
Stratego	4 fl oz/A	2	6.75	3.53	45.56	50.80	54.24	62.06
Exp. A	5 fl oz/A	8	**0.88**	4.05	47.41	51.78	54.04	61.74
Exp. A + Prosaro +	1.4 fl oz/A + 6.5 fl oz/A	2 + 10.51	**1.25**	0.58	45.21	53.05	53.81	61.65
NIS	0.125 % V/V	10.51						
Prosaro + NIS	6.5 fl oz/A + 0.125% V/V	10.51	**0.50**	1.50	47.66	48.83	54.08	61.63
Headline + NIS	3 fl oz/A + 0.125% V/V	2	**5.00**	4.98	44.50	51.61	53.47	62.24
Headline + NIS +	3 fl oz/A + 0.125% V/V	2	**0.50**	0.48	47.08	49.92	54.42	61.49
Fb- Caramba	13.5 fl oz/A	10.51						
Headline + NIS	6 fl oz/A + 0.125% V/V	8-9	**3.50**	2.85	47.43	52.20	54.69	61.79
Headline + NIS +	6 fl oz/A + 0.125% V/V	8-9	**0.25**	**0.25**	46.64	49.63	54.31	61.71
Fb - Caramba	13.5 fl oz/A	10.51						
Exp. B	10 fl oz/A	8-9 & 10.51	**1.75**	0.60	45.42	52.90	53.71	61.79
Exp. B	17.5 fl oz/A	8-9 & 10.51	**0.75**	1.80	47.49	50.50	54.65	61.31
Exp. B	25 fl oz/A	8-9 & 10.51	**0.63**	0.75	46.00	53.38	53.42	62.08
Exp. B +	10 fl oz/A	8-9 & 10.51	**0.75**	0.45	46.98	51.91	54.40	61.93
Punch + NIS	3 fl oz/A + 0.125% V/V	8-9 & 10.51						
Punch + NIS	4 fl oz/A + 0.125% V/V	8-9 & 10.51	**0.63**	**0.08**	45.37	54.65	53.91	61.80
Exp. C	7.7 fl oz/A	8-9 & 10.51	**0.63**	**0.30**	45.75	53.05	54.30	61.74
		$LSD_{(P=0.05)}$	3.03	2.95	NS	NS	NS	NS

[1]-Crop Stage refers to Feekes growth stage (See Table 1 for descriptive crop stages)

Table 3: Responses from Study two of leaf rust disease, yield, and test weight of grain on two spring wheat cultivars and several fungicide treatments applied at various crop stages at two northeastern South Dakota locations.

		Crop	Leaf Rust (% of flag leaf)		Yield (bu/A)		Test Weight (lb/bu)	
Fungicide	Rate	Stage[1]	Brookings	Groton	Brookings	Groton	Brookings	Groton
Untreated			7.55	3.97	36.77	47.07	56.82	62.11
Folicur +	4 fl oz/A	10.51	**0.37**	**0.32**	**44.62**	48.32	**57.41**	62.56
NIS	0.125 % V/V	10.51						
Prosaro +	6.5 fl oz/A	10.51	**0.33**	**0.37**	**43.07**	48.54	**57.82**	62.54
NIS	0.125 % V/V	10.51						
Caramba +	13.5 fl oz/A	10.51	**0.33**	**0.57**	**43.08**	**49.83**	**57.43**	62.27
NIS	0.125 % V/V	10.51						
Topguard	14 fl oz/A	10.51	**1.23**	**1.18**	**41.15**	47.41	**57.39**	62.63
Tilt +	4 fl oz/A	10.51	**0.78**	**0.90**	**41.35**	46.65	57.31	62.36
NIS	0.125 % V/V	10.51						
Tebuconazole +	2 fl oz/A	10.51	**0.33**	**0.50**	**43.44**	46.15	57.20	62.12
Topsin +	8 fl oz/A	10.51						
NIS	0.125 % V/V	10.51						
Tilt +	4 fl oz/A	10.5	**0.85**	**0.97**	**43.33**	46.39	**57.88**	62.44
NIS	0.125 % V/V	10.5						
Headline +	6 fl oz/A	9	**0.08**	**0.07**	**42.42**	48.71	**58.17**	62.71
NIS	0.125 % V/V	9						
Fb - Caramba	13.5 fl oz/A	10.51						
+ NIS	0.125 % V/V	10.51						
Laredo +	7 fl oz/A	10.51	**2.63**	**1.33**	**40.66**	47.19	**57.68**	62.29
NIS	0.125 % V/V	10.51						
Alto	4 fl oz/A	10.51	**0.43**	**0.80**	**42.32**	45.58	**57.47**	62.29
Exp. A + Fb - Prosaro	1.4 fl oz/A	2	**0.13**	**0.08**	**44.95**	**49.53**	**58.09**	62.13
421 SC +	6.5 fl oz/A	10.51						
NIS	0.125 % V/V	10.51						
Prosaro 500C +	6.5 fl oz/A	10.51	8.47	4.10	37.64	46.01	56.75	62.12
NIS	0.125 % V/V	10.51						
		LSD $_{(P=0.05)}$	1.81	0.84	2.67	2.30	0.54	NS

[1]-Crop Stage refers to Feekes growth stage (See Table 1 for descriptive crop stages)

Table 4: Disease responses on Briggs spring wheat at Brookings.

Treatment Name	Rate	Crop Stage	Total Leaf Disease % Leaf Area 7/27/2006	Leaf Rust % Leaf Area 7/27/2006	FHB Incidence % 7/27/2006	FHB Severity % 7/27/2006	FHB Disease Index % 7/27/2006	Yield bu/A 8/23/2006	Test Weight lb/bu 8/23/2006	Protein % 8/23/2006	FDK %	DON PPM
Untreated			10.03	0.77	15.00	32.95	4.98	44.31	56.13	15.75	1.67	0.48
Folicur +	4 fl oz/A	10.51	**3.67**	0.50	14.67	24.84	3.96	47.05	55.94	15.78	2.17	0.67
NIS	0.125 % V/V	10.51										
Prosaro +	6.5 fl oz/A	10.51	**5.70**	**0.27**	**7.67**	30.15	**1.99**	46.38	56.54	15.83	1.33	0.23
NIS	0.125 % V/V	10.51										
Caramba +	13.5 fl oz/A	10.51	**5.83**	**0.10**	9.67	14.54	**1.65**	47.23	56.21	15.70	1.83	0.45
NIS	0.125 % V/V	10.51										
Topguard	14 fl oz/A	10.51	**4.50**	0.57	20.67	20.00	4.41	45.54	56.34	15.78	2.50	0.90
Tilt +	4 fl oz/A	10.51	**6.13**	0.37	10.33	22.68	**2.04**	45.62	55.52	15.80	2.33	0.53
NIS	0.125 % V/V	10.51										
Tebuconazole +	2 fl oz/A	10.51	10.10	**0.20**	14.00	15.27	**2.44**	48.03	55.93	15.93	1.50	0.48
Topsin +	8 fl oz/A	10.51										
NIS	0.125 % V/V	10.51										
Tilt +	4 fl oz/A	10.5	**4.90**	**0.50**	13.00	30.88	4.76	46.54	56.68	15.62	2.17	0.40
NIS	0.125 % V/V	10.5										
Headline +	6 fl oz/A	9	**3.20**	**0.07**	**2.33**	24.70	**1.03**	47.22	57.02	15.03	1.50	0.15
NIS	0.125 % V/V	9										
Fb - Caramba	13.5 fl oz/A	10.51										
+ NIS	0.125 % V/V	10.51										
Laredo +	7 fl oz/A	10.51	**5.73**	**0.30**	**8.00**	18.69	**1.93**	46.84	56.70	15.52	1.67	0.42
NIS	0.125 % V/V	10.51										
Alto	4 fl oz/A	10.51	6.77	0.50	13.33	29.51	3.16	45.91	56.31	15.88	2.33	0.65
Exp. A + Fb - Prosaro 421 SC +	1.4 fl oz/A 6.5 fl oz/A	2 10.51	**3.13**	**0.13**	**7.33**	21.97	**2.06**	48.36	57.09	15.90	1.00	0.18
NIS	0.125 % V/V	10.51										
Prosaro 500C +	6.5 fl oz/A	10.51	11.23	1.00	12.00	36.91	3.74	43.70	56.14	15.42	2.33	0.35
NIS	0.125 % V/V	10.51										
		LSD $_{(P=0.10)}$	4.01	0.38	6.26	NS	2.32	NS	0.79	0.37	NS	0.36

Fb = followed by

Table 5: Disease responses on Ingot spring wheat at Brookings.

Treatment Name	Rate	Rate Unit	Total Leaf Disease % Leaf Area 7/27/2006	Leaf Rust % Leaf Area 7/27/2006	FHB Incidence % 7/27/2006	FHB Severity % 7/27/2006	FHB Disease Index % 7/27/2006	Yield bu/A 8/23/2006	Test Weight lb/bu 8/23/2006	Protein % 8/23/2006	FDK %	DON PPM
Untreated			75.07	14.33	8.00	15.93	1.33	29.24	57.50	14.57	2.17	0.17
Folicur +	4 fl oz/A	10.51	**4.47**	**0.23**	9.33	17.80	1.66	**42.20**	**58.88**	**15.60**	1.67	0.27
NIS	0.125 % V/V	10.51										
Prosaro 421 SC +	6.5 fl oz/A	10.51	**9.30**	**0.40**	3.67	10.56	0.62	**39.75**	**59.11**	**15.85**	1.00	0.32
NIS	0.125 % V/V	10.51										
Caramba +	13.5 fl oz/A	10.51	**5.30**	**0.57**	6.67	21.78	1.92	**38.93**	**58.65**	**15.62**	2.00	0.45
NIS	0.125 % V/V	10.51										
Topguard	14 fl oz/A	10.51	**13.43**	**1.90**	7.33	17.50	1.33	**36.75**	**58.44**	**15.47**	1.50	0.63
Tilt +	4 fl oz/A	10.51	**6.00**	**1.20**	7.67	21.84	1.73	**37.09**	**59.09**	**15.60**	1.33	0.47
NIS	0.125 % V/V	10.51										
Tebuconazole +	2 fl oz/A	10.51	**6.17**	**0.47**	7.00	14.80	1.29	**38.86**	**58.46**	**15.67**	1.67	0.45
Topsin +	8 fl oz/A	10.51										
NIS	0.125 % V/V	10.51										
Tilt +	4 fl oz/A	10.5	**8.43**	**1.20**	5.67	16.03	0.98	**40.12**	**59.09**	**15.77**	1.33	0.52
NIS	0.125 % V/V	10.5										
Headline +	6 fl oz/A	9	**7.37**	**0.10**	4.00	7.61	0.45	**37.61**	**59.31**	**15.40**	1.83	0.20
NIS	0.125 % V/V	9										
Fb - Caramba +	13.5 fl oz/A	10.51										
NIS	0.125 % V/V	10.51										
Laredo +	7 fl oz/A	10.51	**23.17**	**4.97**	7.67	12.42	1.03	**34.48**	**58.65**	**15.37**	1.83	0.12
NIS	0.125 % V/V	10.51										
Alto	4 fl oz/A	10.51	**7.37**	**0.37**	7.00	13.18	0.92	**38.74**	**58.62**	**15.72**	2.33	0.50
Exp. A +	1.4 fl oz/A	2	**6.03**	**0.13**	3.00	5.83	0.21	**41.53**	**59.09**	**15.92**	1.00	0.10
Fb - Prosaro 421 SC +	6.5 fl oz/A	10.51										
NIS	0.125 % V/V	10.51										
Prosaro 500C +	6.5 fl oz/A	10.51	**51.63**	15.93	4.33	14.83	0.86	31.58	57.36	14.67	1.17	0.33
NIS	0.125 % V/V	10.51										
		LSD $_{(P=0.10)}$	11.64	3.59	NS	NS	NS	3.77	0.75	0.28	NS	NS

Fb = followed by