PROJECT TITLE: Evaluation of regional spring wheat, durum, and oat yield trials - 1999

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OBJECTIVE: To evaluate new and introduced lines and cultivars of spring wheat, durum, and oats developed by Universities, the USDA-ARS, and private seed companies, and to determine adaptability of those lines and varieties to conditions in eastern Montana.

MATERIALS AND METHODS:

Dryland: Soil type is Williams loam. Previous crops were 1998 – fallow, 1997 – safflower, 1996 – small grain plots. Residual soil N to 3 feet was 92 lb/ac, residual soil P to 6 inches was 28 ppm, and residual soil K to 6 inches was 246 ppm. Liquid N in the form of 28-0-0 was applied at a rate of 48.8 lb N/ac on 5 November 1998. Bronate was applied 26 May at a rate of 1.5 pt/ac. Plots were 40 ft^2, rows 10 feet long and four rows wide, with one foot between rows. Seasonal precipitation (April-September) in 1999 was 10.76 inches. Average (51 years) is 10.83 inches. Annual precipitation (October 1998 – September 1999) was 17.84 inches. Average (51 years) is 13.95 inches. Soil was wet at planting, resulting in some problem with mud plugging openers on the planter. Affected plots were noted. Weather was cool and wet through June, cool in July, and hot in August, resulting in excellent dryland yields, although grain proteins were low.

Irrigated: Soil type is Savage silty clay. Previous crops were 1998 - sugarbeets, 1997 - foundation McNeal, 1996 - small grain plots. Residual soil N to 4 feet was 28 lb/acre, with 70 lb/acre assumed for sugarbeet tops. Residual soil P to 6 inches was 25 ppm, and residual soil K to 6 inches was 544 ppm. Liquid N in the form of 28-0-0 was applied at a rate of 72 lb N/ac on 5 November 1998. Plots were sprinkler irrigated on 28 June. Buctril was applied on 1 June at a rate of 2 pt/acre. Seasonal precipitation (April-September) in 1999 was 12.56 inches. Average (51 years) is 10.83 inches. . Annual precipitation (October 1998 – September 1999) was 19.64 inches. Average (51 years) is 13.95 inches. A severe hail storm occurred on 8 June, when the small grain was in the boot. Damage to small grain was not apparent at the time, but when the small grain began to head, some damage was observed on the spikes.

Planting and harvest dates were:

Nursery	Planting date	Harvest date
Uniform Regional Hard Red Spring Wheat Trial	14 April	6 August
Uniform Regional Durum Trial – dryland	14 April	6 August
Uniform Regional Durum Trial – irrigated	23 April	6 August
Uniform Regional Oat Trial	14 April	3 August

RESULTS:

Uniform Regional Hard Red Spring Wheat trial: The Uniform Regional Hard Red Spring wheat trial is conducted in cooperation with Dr. G. Linkert of the University of Minnesota, St. Paul. Dr. G. Hareland of North Dakota State University, Fargo, tests quality of each line and variety. Thirty-one experimental lines and varieties of hard red spring wheat were tested under dryland conditions (Table 1). AgriPro line N96-01444 yielded most followed by several Soputh Dakota experimental lines. Average yield was 67.4 bu/acre. Five-year summaries for yield, test weight, and protein are shown in Tables 2 through 4.

Uniform Regional Durum trial, dryland: The Uniform Regional Durum trial is conducted in cooperation with Dr. E.M. Elias, North Dakota State University, Fargo. Dr. G. Hareland of North Dakota State University, Fargo, tests quality of each line and variety. Forty experimental lines and varieties were tested under dryland fallow conditions (Table 5). North Dakota variety Mountrail had the highest yield, followed by North Dakota line D95775. Average yield was 62.9 bu/acre. Five-year summaries for yield, test weight, and protein are shown in Tables 6 through 8.

Uniform Regional Durum trial, irrigated: The Uniform Regional Durum trial is conducted in cooperation with Dr. E.M. Elias, North Dakota State University, Fargo. Dr. G. Hareland of North Dakota State University, Fargo, tests quality of each line and variety. Thirty-two experimental lines and varieties were tested under irrigated conditions (Table 9). North Dakota lines D940027and D95077 yielded most. Average yield was 81.8 bu/acre. Five-year summaries for yield, test weight, protein, and lodging of durum varieties grown under irrigation are shown in Tables 10 through 13.

Uniform Regional Oat trial: The Uniform Regional Oat trial is conducted in cooperation with Dr. D. M. Wesenberg of the USDA-ARS National Small Grain Facility, Aberdeen, ID. Thirty-two experimental lines and varieties were tested (Table 14). Monida and ABSP19-9 yielded most. Average yield was 154.6 bu/acre. Five-year summaries for yield, test weight, and protein are shown in Tables 15 through 17.

SUMMARY: The uniform regional yield trials are conducted at many sites in several states across the western USA, and have been in place since the 1930's. These trials provide important information about experimental lines from state breeding programs, private companies, and the USDA-ARS breeding programs. New varieties are released based on data from these trials.

FUTURE PLANS: New and existing varieties and experimental lines of spring wheat, durum and oat will continue to be tested under dryland and irrigated conditions at the Eastern Agricultural Research Center, so that breeders can release improved varieties and producers can have information on varieties that are adapted to this area. A durum selection and breeding program has been established at EARC in cooperation with the durum breeder from NDSU for development of new varieties adapted to irrigated and dryland conditions in eastern Montana and western North Dakota. New and existing varieties and experimental lines of winter wheat are now being tested under dryland conditions at the Williston Research Center in cooperation with the winter wheat breeder from MSU.

Table 1. Agronomic data obtained from a Uniform Regional hard red spring wheat yield trial grown under dryland fallow conditions at the Eastern Agricultural Research Center, Sidney, MT.
Planting date: 14 April 1999 Harvest date: 6 August 1999

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre[2]	
N96-0144	68	32	11.7	62.0	79.0	a
SD3407	63	38	11.5	62.8	78.1	a
SD3345	63	39	12.8	63.7	76.5	a
SD8119	65	35	12.2	61.2	76.0	a
SD3348	63	33	11.3	62.0	74.2	a
MN95002	64	34	12.5	63.3	71.1	a
SD3310	64	37	12.1	62.8	70.8	a
98T379	70	34	11.1	60.0	70.7	a
MN95229	66	31	12.0	63.0	70.6	a
ND721	68	36	12.3	62.5	70.0	a
Verde	68	33	11.8	60.8	69.6	a
Keene	67	40	12.7	62.7	69.4	a
ND716	67	33	13.2	62.0	69.4	a
N96-0111	68	32	10.9	61.0	69.1	a
ND724	67	38	14.2	61.0	69.0	a
2375	66	36	11.8	61.8	68.4	a
SD3414	62	34	12.4	63.7	68.4	a
ND726	65	38	13.3	63.7	68.2	a
ID523	70	30	10.3	58.7	67.9	a
N96-0060	67	30	11.1	60.3	66.8	
WA7802	67	34	10.9	60.3	65.7	
WA7839	65	32	12.2	61.2	64.3	
ID533	68	33	10.7	60.8	63.8	
98T311	68	33	12.1	59.7	62.7	
BW748	66	37	13.5	60.8	61.5	
BW252	67	35	11.7	60.8	60.1	
FA997703	70	38	12.4	61.7	59.4	
ND709-9	67	34	13.0	61.2	59.0	
Chris 525-1	68	42	13.3	61.2	58.9	
N96-0123	68	29	10.9	62.0	57.4	
Marquis	71	44	13.0	61.3	51.7	
mean	66.6	33.9	12.1	61.6	67.4	
CV (S/mean)	0.4	3.3	5.6	0.8	8.0	
$LDS_{0.05}$	1.1	4.8	1.1	0.9	8.9	

Check variety is Chris with an average yield of 58.9 bu/acre.

[1] Heading date is number of days from planting
[2] a indicates significantly greater yield than check variety, Chris, at a probability of <0.05

Table 2. Relative yields of spring wheat varieties as compared to Chris when grown under dryland fallow conditions in the Uniform Regional Hard Red Spring Wheat yield trial at EARC, Sidney Montana.

Cultivar	1995	1996	1997	1998	1999	Ave	as % of Chris
McVey	--	50.2	53.0	60.7	--	54.6	138.3
Reeder	--	46.6	49.3	64.9	--	53.6	135.7
N96-0144	--	--	--	--	79.0	79.0	134.1
ND 706	--	--	--	63.7	--	63.7	131.3
N95-0026	--	--	--	59.8	--	59.8	123.3
Norpro	--	--	41.2	63.5	--	52.4	122.5
2375	--	--	--	62.8	68.4	65.6	122.2
Keene	38.3	--	--	62.8	69.4	56.8	122.1
Scholar	--	36.5	48.8	--	--	42.7	121.9
Parshall	--	44.6	44.9	54.2	--	47.9	121.3
Verde	--	--	--	58.8	69.6	64.2	119.6
ND721	--	--	--	--	70.0	70.0	118.8
ND716	--	--	--	--	69.4	69.4	117.8
N95-0144	--	--	--	57.0	--	57.0	117.5
N96-0111	--	--	--	--	69.1	69.1	117.3
N95-0264	--	--	--	56.8	--	56.8	117.1
ND724	--	--	--	--	69.0	69.0	117.1
ND726	--	--	--	--	68.2	68.2	115.8
N96-0060	--	--	--	--	66.8	66.8	113.4
N95-0204	--	--	--	53.0	--	53.0	109.3
MT9609	--	--	--	52.7	--	52.7	108.7
N95-0330	--	--	--	52.2	--	52.2	107.6
ND 705	--	--	--	51.9	--	51.9	107.0
ND709-9	--	--	--	--	59.0	59.0	100.2
Chris 525-1	32.2	33.0	37.0	48.5	58.9	41.9	100.0
Zeke	--	--	31.6	53.7	--	42.7	99.8
N96-0123	--	--	--	--	57.4	57.4	97.5
Marquis	19.7	30.9	31.6	44.0	51.7	35.6	84.9

NOTE: Average yields in this summary should not be compared to each other since they are not grown in the same years. Compare yields only to the check variety.

Table 3. Relative test weights of spring wheat varieties as compared to Chris when grown under dryland fallow conditions in the Uniform Regional Hard Red Spring Wheat yield trial at EARC, Sidney Montana.

Cultivar	1995	1996	1997	1998	1999	Ave	as % of Chris
ND 705	--	--	--	62.3	--	62.3	106.0
ND726	--	--	--	--	63.7	63.7	104.1
Parshall	--	63.2	61.0	61.2	--	61.8	103.5
Norpro	--	--	60.0	61.0	--	60.5	102.9
N95-0264	--	--	--	60.5	--	60.5	102.9
Reeder	--	63.2	60.8	60.2	--	61.4	102.8
Keene	61.5	--	--	61.3	62.7	61.8	102.4
Scholar	--	62.2	61.0	--	--	61.6	102.3
2375	--	--	--	60.7	61.8	61.3	102.1
ND721	--	--	--	--	62.5	62.5	102.1
N95-0026	--	--	--	59.8	--	59.8	101.7
MT9609	--	--	--	59.7	--	59.7	101.5
ND716	--	--	--	--	62.0	62.0	101.3
N96-0144	--	--	--	--	62.0	62.0	101.3
N96-0123	--	--	--	--	62.0	62.0	101.3
N95-0330	--	--	--	59.3	--	59.3	100.9
Marquis	61.4	61.5	59.9	58.0	61.3	60.4	100.2
Chris 525-1	61.2	61.6	58.8	58.8	61.2	60.3	100.0
Verde	--	--	--	59.2	60.8	60.0	100.0
ND709-9	--	--	--	--	61.2	61.2	100.0
Zeke	--	--	58.7	58.7	--	58.7	99.8
N96-0111	--	--	--	--	61.0	61.0	99.7
ND724	--	--	--	--	61.0	61.0	99.7
N95-0144	--	--	--	58.5	--	58.5	99.5
ND 706	--	--	--	58.0	--	58.0	98.6
N95-0204	--	--	--	58.0	--	58.0	98.6
N96-0060	--	--	--	--	60.3	60.3	98.5
McVey	--	60.0	57.5	56.3	--	57.9	97.0

NOTE: Average test weights in this summary should not be compared to each other since they are not grown in the same years. Compare test weights only to the check variety.

Table 4. Relative protein contents of spring wheat varieties as compared to Chris when grown under dryland fallow conditions in the Uniform Regional Hard Red Spring Wheat yield trial at EARC, Sidney Montana.

Cultivar	1995	1996	1997	1998	1999	Ave	as % of Chris
ND 705	--	--	--	17.8	--	17.8	114.8
ND724	--	--	--	--	14.2	14.2	106.8
Parshall	--	13.3	15.7	16.3	--	15.1	101.1
N95-0204	--	--	--	15.6	--	15.6	100.6
N95-0330	--	--	--	15.6	--	15.6	100.6
Chris 525-1	14.7	13.3	16.0	15.5	13.3	14.6	100.0
ND726	--	--	--	--	13.3	13.3	100.0
Zeke	--	--	16.5	14.9	--	15.7	99.7
ND 706	--	--	--	15.4	--	15.4	99.4
ND716	--	--	--	--	13.2	13.2	99.2
Marquis	15.2	13.0	15.4	15.4	13.0	14.4	98.9
Norpro	--	--	15.7	15.2	--	15.5	98.1
ND709-9	--	--	--	--	13.0	13.0	97.7
Keene	14.6	--	--	15.0	12.7	14.1	97.2
MT9609	--	--	--	15.0	--	15.0	96.8
N95-0026	--	--	--	14.9	--	14.9	96.1
Reeder	--	12.3	14.7	15.3	--	14.1	94.4
Scholar	--	12.8	14.8	--	--	13.8	94.2
ND721	--	--	--	--	12.3	12.3	92.5
2375	--	--	--	14.6	11.8	13.2	91.7
N95-0144	--	--	--	14.1	--	14.1	91.0
Verde	--	--	--	14.3	11.8	13.1	90.6
N96-0144	--	--	--	--	11.7	11.7	88.0
N95-0264	--	--	--	13.5	--	13.5	87.1
McVey	--	10.8	13.2	13.6	--	12.5	83.9
N96-0060	--	--	--	--	11.1	11.1	83.5
N96-0111	--	--	--	--	10.9	10.9	82.0
N96-0123	--	--	--	--	10.9	10.9	82.0

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare protein contents only to the check variety.

Table 5. Agronomic data obtained from a Uniform Regional durum yield trial grown under dryland fallow conditions at the Eastern Agricultural Research Center, Sidney, MT.
Planting date: 14 April 1999 Harvest date: 6 August 1999

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre[2]	
Mountrail	69	35	12.3	61.7	77.9	a
D95775	69	35	12.3	62.0	71.3	
D940027	67	30	11.3	62.5	71.1	
AC Avonlea	67	36	12.4	61.2	69.3	
D941276	67	34	12.0	61.2	69.1	
D95776	68	34	13.3	61.7	68.5	
D957452	67	34	12.7	62.5	66.4	
D95077	66	33	12.3	61.2	65.8	
Plaza	69	28	10.9	62.0	65.4	
Belzer	68	36	11.9	59.8	65.2	
D95744	66	33	12.3	62.3	64.9	
D941229	68	33	11.5	61.3	64.8	
D941038	68	33	12.1	62.3	64.6	
D941033	68	34	12.5	61.3	64.1	
D941261	69	32	12.6	62.7	64.1	
D940098	67	27	10.9	64.0	63.8	
D941515	66	33	11.4	62.7	63.6	
D95081	68	30	12.1	62.0	63.3	
AC Melita	68	35	12.3	61.2	63.1	
D95699	69	36	12.6	61.0	63.1	
Renville	68	36	11.5	61.8	63.0	
Sceptre	68	33	12.5	61.8	62.7	
D941030	68	35	12.9	61.0	62.7	
D941514	65	35	12.7	62.0	61.9	
Kari	67	33	12.6	61.7	61.7	
Maier	68	32	12.1	61.8	61.6	
Voss	69	26	12.0	60.3	61.6	
Utopia	63	25	11.7	60.5	61.5	
D95746	68	33	12.0	62.7	61.3	
Plenty	69	37	11.9	61.2	61.2	
D95672	68	35	12.8	62.8	60.4	
Kyle	70	40	11.3	61.7	60.3	
Ben	68	35	12.2	62.8	59.7	
Lebsock	67	32	11.6	63.3	59.4	
Munich	66	30	12.7	61.0	59.1	
D95075	66	30	11.6	62.3	58.2	
D95580	68	34	12.3	61.2	55.8	
Rugby	66	35	12.8	62.8	55.2	
Monroe	63	34	12.0	61.8	53.2	x
PH894401	63	25	11.8	62.7	46.9	x
mean	67.3	32.8	12.1	61.8	62.9	
CV (S/mean)	0.4	5.6	4.5	0.9	8.9	
$LDS_{0.05}$	1.1	3.0	0.9	0.9	9.1	

Check variety is Renville with an average yield of 63.0 bu/acre.

[1] Heading date is number of days from planting

[2] a indicates significantly greater yield than check variety, Renvillel at a probability of <0.05
x indicates significantly lower yield than check variety, Renville, at a probability of <0.05

Table 6. Relative yields of durum varieties as compared to Renville when grown under dryland fallow conditions at the EARC, Sidney, Montana.

Cultivar	1995	1996	1997[1]	1997[2]	1998	1999	Ave	as % of Renville
Mountrail	57.6	40.2	36.2	--	61.2	77.9	54.6	110.6
AC Avonlea	--	--	--	--	--	69.3	69.3	110.0
Plaza	52.2	39.6	39.9	--	59.3	65.4	51.3	103.8
Maier	49.0	41.1	37.9	--	59.6	61.6	49.8	100.9
Renville	55.3	37.0	32.5	34.7	59.1	63.0	46.9	100.0
Sceptre	--	--	--	--	--	62.7	62.7	99.5
Belzer	50.0	35.7	36.9	--	57.4	65.2	49.0	99.3
Ben	48.3	39.5	40.6	34.7	54.0	59.7	46.1	98.3
Lebsock	51.6	38.2	35.1	--	58.1	59.4	48.5	98.2
Utopia	--	--	--	--	--	61.5	61.5	97.6
Voss	--	--	--	32.4	--	61.8	47.1	96.4
Munich	50.6	39.2	33.8	30.3	54.9	59.1	44.7	95.1
Kyle	48.3	38.2	--	--	--	60.3	48.9	94.5
Rugby	52.0	36.0	31.0	--	56.1	55.2	46.1	93.3
Kari	--	--	--	31.1	52.6	61.7	48.5	92.7
AC Melita	--	--	--	30.4	51.4	63.1	48.3	92.4
Plenty	43.1	36.7	--	--	--	61.2	47.0	90.8
Monroe	45.5	39.7	26.5	--	52.3	53.2	43.4	88.0

NOTE: Average yields in this summary should not be compared to each other since they are not grown in the same years. Compare yields only to the check variety, Renville.

[1]Uniform regional durum trial
[2]Commercial dryland durum trial

Table 7. Relative test weights of durum varieties as compared to Renville when grown under dryland fallow conditions at the EARC, Sidney, Montana.

Cultivar	1995	1996	1997[1]	1997[2]	1998	1999	Ave	as % of Renville
Lebsock	63.2	64.2	61.2	--	61.2	63.3	62.6	101.8
Rugby	62.7	63.3	62.3	--	60.5	62.8	62.3	101.3
Ben	62.7	62.8	60.9	62.2	60.2	62.8	61.9	100.9
Kari	--	--	--	61.7	59.8	61.7	61.1	100.6
Maier	62.2	63.6	60.2	--	61.0	61.8	61.8	100.4
Voss	--	--	--	62.4	--	60.3	61.4	100.2
Renville	62.3	62.3	61.4	60.6	59.8	61.8	61.4	100.0
Sceptre	--	--	--	--	--	61.8	61.8	100.0
Monroe	62.0	63.0	60.1	--	60.3	61.8	61.4	99.9
Kyle	62.5	62.0	--	--	--	61.7	62.1	99.9
Plaza	62.8	62.4	59.8	--	60.0	62.0	61.4	99.8
AC Melita	--	--	--	60.0	59.8	61.2	60.3	99.7
Mountrail	62.2	62.3	60.0	--	59.7	61.7	61.2	99.4
Munich	62.2	61.9	61.2	60.6	58.7	61.0	60.9	99.3
Plenty	62.0	61.9	--	--	--	61.2	61.7	99.3
AC Avonlea	--	--	--	--	--	61.2	61.2	99.0
Utopia	--	--	--	--	--	60.5	60.5	97.9
Belzer	61.7	61.1	57.8	--	58.7	59.8	59.8	97.2

NOTE: Average test weights in this summary should not be compared to each other since they are not grown in the same years. Compare test weights only to the check variety, Renville.

[1]Uniform regional durum trial
[2]Commercial dryland durum trial

Table 8. Relative protein contents of durum varieties as compared to Renville when grown under dryland fallow conditions at the EARC, Sidney, Montana.

Cultivar	1995	1996	1997[1]	1997[2]	1998	1999	Ave	as % of Renville
Sceptre	--	--	--	--	--	12.5	12.5	108.7
AC Avonlea	--	--	--	--	--	12.4	12.4	107.8
Plenty	15.8	12.6	--	--	--	11.9	13.4	106.9
Kyle	16.3	12.0	--	--	--	11.3	13.2	105.0
Rugby	15.2	12.2	15.4	--	14.2	12.8	14.0	103.6
Monroe	16.2	12.0	15.3	--	14.0	12.0	13.9	103.1
Utopia	--	--	--	--	--	11.7	11.7	101.7
Munich	13.7	12.2	15.1	15.2	15.0	12.7	14.0	101.6
AC Melita	--	--	--	14.5	14.5	12.3	13.8	100.7
Kari	--	--	--	14.3	14.6	12.6	13.8	100.5
Ben	14.2	12.7	14.5	14.6	14.5	12.2	13.8	100.1
Maier	14.0	11.4	15.3	--	14.7	12.1	13.5	100.1
Renville	13.8	12.4	15.4	15.2	14.3	11.5	13.8	100.0
Belzer	14.1	12.4	14.2	--	14.5	11.9	13.4	99.6
Voss	--	--	--	14.4	--	12.0	13.2	98.9
Mountrail	14.0	11.4	14.5	--	14.3	12.3	13.3	98.7
Lebsock	14.7	11.6	14.4	--	14.0	11.6	13.3	98.4
Plaza	14.8	10.8	14.0	--	14.0	10.9	12.9	95.7

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare only to the check variety, Renville.

[1]Uniform regional durum trial
[2]Commercial dryland durum trial

Table 9. Agronomic data obtained from a Uniform Regional durum yield trial grown under irrigated conditions at the Eastern Agricultural Research Center, Sidney, MT.
Planting date: 23 April 1999 Harvest date: 6 August 1999

Variety	Days to heading [1]	Lodging index	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre [2]	
D940027	61	0.0	36	12.6	60.3	90.9	a
D95077	60	0.7	39	13.0	61.5	90.4	a
Maier	60	2.0	38	13.6	60.8	89.4	
D941261	61	1.0	39	13.6	62.0	89.3	
Plaza	62	0.0	34	12.7	60.5	88.5	
D940098	60	0.0	34	12.2	62.0	86.9	
D95775	61	1.3	38	13.4	60.8	86.1	
Mountrail	60	3.3	41	13.3	60.7	85.9	
D941038	61	2.0	40	12.8	61.5	85.1	
D95699	61	5.3	42	14.1	60.0	84.0	
D95075	60	1.0	39	13.2	60.3	83.9	
Lebsock	59	0.7	40	13.8	61.7	83.8	
Munich	59	1.0	38	13.4	60.5	83.7	
D941030	60	4.7	41	13.8	60.5	83.3	
D95745	60	1.7	39	13.8	61.0	83.0	
D95580	61	2.7	41	13.3	59.0	82.0	
D95081	60	4.0	39	13.3	58.8	81.2	
D95776	61	3.0	39	14.1	60.3	81.1	
D941276	61	3.7	41	12.7	60.7	81.0	
Renville	60	5:0	42	13.8	60.8	80.9	
D941033	59	3.7	36	13.5	59.5	80.4	
D95746	61	1.3	39	14.0	60.8	80.1	
Ben	60	2.7	39	13.6	61.5	79.5	
D95744	61	2.3	39	13.7	59.7	79.1	
Monroe	56	4.0	41	13.8	60.3	79.0	
D941515	59	2.3	40	12.8	61.0	78.4	
D95672	61	5.3	42	14.0	62.7	77.6	
D941514	58	2.3	42	13.6	60.0	77.1	
Rugby	61	4.0	41	14.1	59.2	72.4	
D941229	60	1.0	39	13.2	60.0	72.1	x
Belzer	61	4.0	41	14.1	57.7	70.4	x
AC Avonlea	60	3.0	41	14.6	58.5	70.1	x
mean	60.1	2.5	39.3	13.5	60.5	81.8	
CV (S/mean)	0.4	39.3	3.5	3.2	1.6	6.4	
$LDS_{0.05}$	1.2	1.6	2.2	0.7	1.6	8.6	

Check variety is Renville with an average yield of 80.9 bu/acre.

[1] Heading date is number of days from planting
[2] a indicates significantly greater yield than check variety, Renville, at a probability of <0.05
x indicates significantly lower yield than check variety, Renville, at a probability of <0.05

Table 10. Relative yields of durum varieties compared to Renville when grown under irrigated conditions at the EARC, Sidney, Montana.

Cultivar	1995	1996	1997[1]	1997[2]	1998	1999	Ave	as % of Renville
Mountrail	--	--	--	--	65.9	98.7	82.3	113.1
Plaza	--	--	--	--	63.5	94.2	78.9	108.4
AC Morse	--	--	--	--	65.8	88.7	77.3	106.2
Maier	--	--	--	--	63.4	90.5	77.0	105.8
Belzer	--	--	--	--	64.8	87.4	76.1	104.6
Kari	--	--	--	61.2	60.1	88.8	70.0	102.5
Lebsock	--	--	--	--	63.5	85.1	74.3	102.1
Renville	67.2	96.6	72.3	59.5	60.8	84.7	73.5	100.0
Munich	73.2	95.7	64.5	56.0	64.6	86.9	73.5	100.0
Ben	--	96.8	66.6	54.9	65.0	83.7	73.4	98.2
Sceptre	--	--	--	--	--	83.1	83.1	98.1
AC Melita	--	--	--	57.8	62.0	80.8	66.9	97.9
Utopia	--	--	--	--	--	81.8	81.8	96.6
Voss	72.0	99.2	59.8	48.8	--	85.1	73.0	96.0
Laker	67.3	97.9	57.0	--	--	83.6	76.5	95.3
Kyle	63.9	90.4	77.5	--	--	73.6	76.4	95.2
Plenty	66.7	87.5	67.5	--	--	82.7	76.1	94.9
Vic	67.6	85.0	68.4	--	56.0	77.7	70.9	93.0
Medora	70.3	86.8	63.1	--	52.4	80.4	70.6	92.5
Ward	65.4	87.4	63.8	--	--	77.0	73.4	91.5
Crosby	--	--	--	--	--	76.5	76.5	90.3
Lloyd	--	92.2	56.9	--	47.9	83.9	70.2	89.3
Monroe	67.5	83.8	59.6	--	52.2	76.0	67.8	88.9
AC Avonlea	--	--	--	--	--	70.1	70.1	82.8
Command	--	--	--	--	--	67.3	67.3	79.5

NOTE: Average yields in this summary should not be compared to each other since they are not grown in the same years. Compare yields only to the check variety.

[1]Statewide irrigated durum trial
[2]Commercial irrigated durum trial

Table 11. Relative test weights of durum varieties compared to Renville when grown under irrigated conditions at the EARC, Sidney, Montana.

Cultivar	1995	1996	1997[1]	1997[2]	1998	1999	Ave	as % of Renville
Lebsock	--	--	--	--	62.5	63.7	63.1	101.5
Plaza	--	--	--	--	62.8	63.0	62.9	101.2
Ben	--	63.6	62.2	62.0	62.5	62.8	62.6	101.0
Mountrail	--	--	--	--	62.2	62.7	62.5	100.5
Munich	59.0	63.1	61.3	61.5	61.2	62.7	61.5	100.2
Medora	58.0	63.1	61.8	--	61.5	62.5	61.4	100.2
Plenty	58.0	63.0	61.3	--	--	62.3	61.2	100.1
Renville	58.0	62.8	61.3	61.5	62.0	62.3	61.3	100.0
Maier	--	--	--	--	61.8	62.5	62.2	100.0
Vic	57.7	63.0	60.8	--	62.2	61.8	61.1	99.7
Kari	--	--	--	61.0	61.5	62.7	61.7	99.7
Ward	58.2	63.0	60.3	--	--	61.7	60.8	99.5
Voss	57.5	62.8	59.5	61.7	--	62.7	60.8	99.4
Crosby	--	--	--	--	--	61.8	61.8	99.2
Monroe	57.5	63.0	61.2	--	60.5	61.7	60.8	99.2
AC Melita	--	--	--	60.8	61.2	62.2	61.4	99.1
AC Morse	--	--	--	--	61.2	62.0	61.6	99.1
Kyle	57.5	61.6	60.2	--	--	61.7	60.3	98.6
Sceptre	--	--	--	--	--	61.3	61.3	98.4
Command	--	--	--	--	--	61.3	61.3	98.4
Belzer	--	--	--	--	61.3	60.8	61.1	98.2
Lloyd	--	63.0	61.0	--	58.3	61.5	61.0	98.1
Laker	56.0	61.9	59.0	--	--	60.7	59.4	97.2
Utopia	--	--	--	--	--	59.3	59.3	95.2
AC Avonlea	--	--	--	--	--	58.5	58.5	93.9

NOTE: Average test weights in this summary should not be compared to each other since they are not grown in the same years. Compare test weights only to the check variety.

[1]Statewide irrigated durum trial
[2]Commercial irrigated durum trial

Table 12. Relative proteins of durum varieties compared to Renville when grown under irrigated conditions at the EARC, Sidney, Montana.

Cultivar	1995	1996	1997[1]	1997[2]	1998	1999	Ave	as % of Renville
AC Avonlea	--	--	--	--	--	14.6	14.6	118.7
Crosby	--	--	--	--	--	13.2	13.2	107.3
Maier	--	--	--	--	13.5	12.5	13.0	102.8
Command	--	--	--	--	--	12.5	12.5	101.6
Kari	--	--	--	11.2	12.8	12.9	12.3	101.4
Ward	16.1	13.6	11.5	--	--	12.7	13.5	101.3
Lebsock	--	--	--	--	12.7	12.9	12.8	101.2
Ben	--	13.3	11.0	11.5	13.2	12.7	12.3	100.8
Utopia	--	--	--	--	--	12.4	12.4	100.8
Mountrail	--	--	--	--	13.4	12.0	12.7	100.4
Kyle	16.8	13.7	10.0	--	--	12.9	13.4	100.4
Renville	16.1	13.9	10.9	11.1	13.0	12.3	12.9	100.0
Belzer	--	--	--	--	12.7	12.6	12.7	100.0
Medora	15.6	13.6	11.1	--	13.0	12.8	13.2	99.8
AC Melita	--	--	--	11.5	12.3	12.4	12.1	99.5
AC Morse	--	--	--	--	12.7	12.2	12.5	98.4
Sceptre	--	--	--	--	--	12.1	12.1	98.4
Monroe	15.6	13.0	11.0	--	12.6	12.9	13.0	98.3
Munich	15.0	12.8	10.9	11.0	13.3	12.8	12.6	98.1
Plaza	--	--	--	--	13.2	11.6	12.4	98.0
Plenty	15.6	13.8	10.1	--	--	12.5	13.0	97.7
Vic	14.9	13.2	10.3	--	12.4	13.1	12.8	96.5
Lloyd	--	11.9	10.8	--	13.1	12.0	12.0	95.4
Voss	15.5	11.8	10.6	10.8	--	12.2	12.2	94.7
Laker	14.7	12.2	10.6	--	--	11.8	12.3	92.7

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare protein contents only to the check variety.

[1]Statewide irrigated durum trial
[2]Commercial irrigated durum trial

Table 13. Relative lodging indices of durum varieties compared to Ward when grown under irrigated conditions at EARC, Sidney, Montana, over a five-year period.

Cultivar	1993	1995	1996	1999	Ave	as % of Renville
Kyle	--	9.0	5.5	7.3	7.3	209.6
Plenty	3.6	2.6	2.3	5.3	3.4	119.0
Renville	1.2	2.2	3.5	4.7	2.9	100.0
Vic	2.4	3.4	1.7	4.0	2.9	99.1
Medora	1.4	3.3	2.7	3.0	2.6	89.7
Monroe	4.0	1.8	2.0	2.3	2.5	87.1
Crosby	3.4	--	0.0	4.7	2.7	86.2
Ward	1.1	2.6	2.0	4.0	2.4	83.6
AC Avonlea	--	--	--	3.0	3.0	63.8
Laker	1.2	4.5	1.3	0.3	1.8	62.9
Sceptre		--	--	2.7	2.7	57.4
Maier	--	--	--	2.0	2.0	42.6
Belzer	--	--	--	2.0	2.0	42.6
AC Melita	--	--	--	2.0	2.0	42.6
Ben	--	--	1.3	1.7	1.5	36.6
Mountrail	--	--	--	1.7	1.7	36.2
Munich	--	1.5	1.0	1.0	1.2	33.7
Kari	--	--	--	1.3	1.3	27.7
AC Morse	--	--	--	1.3	1.3	27.7
Lebsock	--	--	--	0.7	0.7	14.9
Lloyd	0.0	--	0.3	0.0	0.1	3.2
Voss	--	0.0	0.0	0.0	0.0	0.0
Plaza	--	--	--	0.0	0.0	0.0
Utopia	--	--	--	0.0	0.0	0.0
PH894401	--	--	--	0.0	0.0	0.0
Command	--	--	--	0.0	0.0	0.0

NOTE: Average lodging indices in this summary should not be compared to each other since they are not grown in the same years. Compare lodging only to the check variety.

Table 14. Agronomic data obtained from a dryland Uniform Regional oat yield trial grown under dryland fallow conditions at the Eastern Agricultural Research Center, Sidney, MT.
Planting date: 14 April 1999 Harvest date: 3 August 1999

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre[2]	
Monida	71	41	10.2	37.7	178.0	a
ABSP19-9	72	39	9.6	39.0	176.0	
87AB5632	70	37	10.6	37.8	175.3	
ND870258	70	38	10.5	38.7	174.1	
91AB406	70	32	10.0	37.5	170.1	
ND930122	68	36	11.3	38.0	169.6	
90AB1322	70	32	10.8	38.0	169.4	
95A12743	70	33	10.6	37.0	169.2	
ABSP9-2	69	37	9.6	39.5	168.0	
Prairie	66	35	10.0	37.2	166.2	
91AB502	65	33	9.5	39.0	164.7	
Rio Grande	68	35	11.0	38.0	164.7	
87AB4983	67	30	10.9	38.8	163.4	
87AB5125	70	32	9.7	39.3	162.7	
89AB4088	67	35	11.8	40.2	162.0	
Cayuse	70	37	10.8	36.7	161.4	
ND860416	69	40	10.2	38.5	161.1	
Celsia	71	40	10.0	37.8	161.0	
86AB664	69	37	9.8	38.0	160.8	
CDC Boyer	69	44	9.9	36.0	160.1	
Otana	69	42	10.4	38.8	160.0	
Powell	72	33	10.8	36.7	159.1	
Derby	70	45	9.6	38.5	158.7	
CDC Pacer	70	41	10.1	36.5	155.3	
94AB5543	72	38	11.2	38.3	152.7	
ND910569	70	34	10.5	36.2	152.6	
84AB825	72	34	10.4	36.3	144.8	
Ajay	70	27	11.6	36.3	143.0	x
Belmont	69	40	11.0	37.5	104.2	x
86AB1616	73	37	10.7	39.0	103.1	x
88AB3073	71	33	11.5	42.3	94.4	x
Paul	70	42	9.4	42.0	82.5	x
mean	70.6	36.5	10.4	38.2	154.6	
CV (S/mean)	0.4	3.6	7.4	2.1	6.4	
$LDS_{0.05}$	1.1	2.2	1.3	1.3	16.2	

Check variety is Otana with an average yield of 160.0 bu/acre.

[1] Heading date is number of days from planting
[2] a indicates significantly greater yield than check variety, Renville, at a probability of <0.05
x indicates significantly lower yield than check variety, Renville, at a probability of <0.05

Table 15. Relative yields of oat varieties as compared to Otana when grown under dryland fallow conditions at the EARC, Sidney, Montana.

Cultivar	1995	1996	1997	1998	1999	Ave	as % of Otana
Monida	129.4	84.2	120.7	151.2	178.0	132.7	109.9
ND870258	--	--	--	--	174.1	174.1	108.8
ABSP9-2	--	81.8	134.4	146.6	168.0	132.7	108.3
ABSP 19-9	--	--	124.8	147.2	176.0	149.3	107.6
ND860416	116.4	85.0	141.6	145.4	161.1	129.9	107.5
ND930122	--	--	--	--	169.6	169.6	106.0
Powell	119.2	81.3	127.5	136.8	159.1	124.8	103.3
Cayuse	113.8	79.1	115.9	148.0	161.4	123.6	102.4
CDC Boyer	--	--	121.2	144.1	160.1	141.8	102.1
Celsia	110.6	76.1	131.0	138.1	161.0	123.4	102.1
Prairie	115.1	80.7	106.3	146.9	166.2	123.0	101.9
Otana	114.1	73.4	108.9	147.6	160.0	120.8	100.0
Rio Grande	119.5	76.4	101.7	140.7	164.7	120.6	99.8
Derby	95.4	82.6	127.8	134.3	158.7	119.8	99.1
CDC Pacer	--	--	118.6	134.9	155.3	136.3	98.2
Ajay	105.4	74.8	119.4	136.5	143.0	115.8	95.9
ND910569	--	--	--	--	152.6	152.6	95.4
Belmont	--	--	--	--	104.2	104.2	65.1
Paul	74.6	50.0	--	--	82.5	69.0	59.6

NOTE: Average yields in this summary should not be compared to each other since they are not grown in the same years. Compare yields only to the check variety.

Table 16. Relative test weights of oat varieties as compared to Otana when grown under dryland fallow conditions at the EARC, Sidney, Montana.

Cultivar	1995	1996	1997	1998	1999	Ave	as % of Otana
Paul	47.3	43.8	--	--	42.0	44.4	117.1
Otana	38.2	36.7	34.8	33.3	38.8	36.4	100.0
ND870258	--	--	--	--	38.7	38.7	99.7
ABSP 19-9	--	--	34.2	33.2	39.0	35.5	99.5
ABSP9-2	--	34.4	35.0	33.5	39.5	35.6	99.2
ND860416	37.3	36.4	33.7	32.7	38.5	35.7	98.2
ND930122	--	--	--	--	38.0	38.0	97.9
Derby	38.0	34.9	33.0	31.5	38.5	35.2	96.8
Belmont	--	--	--	--	37.5	37.5	96.6
Monida	37.8	35.4	33.2	29.3	37.7	34.7	95.4
CDC Pacer	--	--	33.7	31.7	36.5	34.0	95.3
Ajay	36.8	33.8	33.0	31.5	36.3	34.3	94.3
Rio Grande	36.8	31.8	32.0	32.7	38.0	34.3	94.2
Prairie	36.3	32.6	32.2	32.3	37.2	34.1	93.8
ND910569	--	--	--	--	36.2	36.2	93.3
Celsia	36.5	32.7	32.3	29.7	37.8	33.8	93.0
CDC Boyer	--	--	31.0	31.2	36.0	32.7	91.9
Powell	36.2	30.4	32.0	29.5	36.7	33.0	90.6
Cayuse	35.3	29.6	30.8	30.5	36.7	32.6	89.6

NOTE: Average test weights in this summary should not be compared to each other since they are not grown in the same years. Compare test weights only to the check variety.

Table 17. Relative protein contents of oat varieties as compared to Otana when grown under dryland fallow conditions at the EARC, Sidney, Montana.

Cultivar	1995	1996	1997	1998	1999	Ave	as % of Otana
Paul	17.9	15.8	--	--	9.4	14.4	126.8
ND930122	--	--	--	--	11.3	11.3	108.7
Belmont	--	--	--	--	11.0	11.0	105.8
Ajay	14.3	10.5	14.0	12.2	11.6	12.5	105.2
Rio Grande	13.5	10.2	13.8	12.2	11.0	12.1	102.0
ND870258	--	--	--	--	10.5	10.5	101.0
ND910569	--	--	--	--	10.5	10.5	101.0
Otana	14.3	9.3	13.7	11.8	10.4	11.9	100.0
Prairie	14.2	9.7	13.4	11.0	10.0	11.7	98.0
Cayuse	13.1	9.7	13.0	11.7	10.8	11.7	98.0
Powell	12.7	9.3	13.6	11.8	10.8	11.6	97.8
CDC Boyer	--	--	13.2	12.0	9.9	11.7	97.8
ABSP 19-9	--	--	13.7	11.5	9.6	11.6	96.9
ABSP9-2	--	9.6	12.6	12.0	9.6	11.0	96.9
Monida	13.4	9.0	13.1	11.8	10.2	11.5	96.6
CDC Pacer	--	--	13.0	11.4	10.1	11.5	96.1
ND860416	13.6	9.0	12.6	11.4	10.2	11.4	95.5
Derby	13.8	9.0	12.8	11.3	9.6	11.3	95.0
Celsia	13.2	9.2	12.5	11.0	10.0	11.2	93.9

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare protein contents only to the check variety.