PROJECT TITLE: Evaluation of spring wheat, durum, barley, and oat varieties under minimum-till, continuous cropping conditions – 1998

PROJECT LEADER:

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OBJECTIVE: To determine the best adapted varieties of spring wheat, durum, barley, and oats for production under continuous cropping conditions in eastern Montana.

MATERIALS AND METHODS: Soil type is a Williams loam. Previous crop was spring wheat in 1997, safflower in 1996, and small grain in 1995. Residual soil N was 38 lb/acre to two feet, residual soil P was 41 ppm to six inches and residual soil K was 415 ppm to six inches.. Nitrogen was applied at a rate of 48.8 lb N/A as liquid 28-0-0 on 5 November 1997. Bronate was applied at a rate of 1.5 pt/A on 26 May 1998.

All trials were replicated three times. Plots were 20 feet long and three rows wide, with one foot between rows. At harvest, all rows were harvested with a plot combine for yield, test weight, and protein determinations. Planting and harvest dates were

Crop	Planting date	Harvest date
Spring wheat	21 April	3 August
Durum	21 April	3 August
Barley	21 April	27 July
Oats	21 April	31 July

Growing season precipitation (Apr-Sep) in 1998 was 7.51 inches. The 50-year average is 9.41 inches. Precipitation from Oct 1997 –Sep 1998 was 9.11 inches. The 50-year average for that period is 13.72 inches. Soil moisture was excellent at planting and adequate for early season growth. Weather was dry until mid-June, when showers occurred in a timely fashion. Yields were above average, in spite of early season drought.

RESULTS:

Spring wheat: Twenty-four lines and varieties of spring wheat were tested under dryland recrop conditions (Table 1). North Dakota line 695, McNeal, and Scholar yielded the most. Average yield was 34.6 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 2 through 5.

Durum: Nineteen durum varieties were tested under dryland recrop conditions (Table 6). Dressler, D91080, and AC Morse yielded most. Average yield was 33.2 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 7 through 10.

Barley: Sixteen barley lines and varieties were tested under dryland recrop conditions (Table 11). Chinook, Montana line MT920073, and Gallatin yielded the most. Average yield was 56.6 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 12 through 15.

Oats: Fourteen oat varieties were tested under dryland recrop conditions (Table 16). Otana, Rio Grande, and ND 860416 yielded the most. Average yield was 93.2 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 17 through 20.

SUMMARY: The experiments reported under this project are all of the replicated small plot type. The three-year crop rotation is small grain, small grain yield trials, safflower. Bromoxynil at a rate of 1.5 pt/acre is used for broadleaf weed control in the small grain, and trifluralin at a rate of 1.5 pt/acre is used in the safflower. This weed control and crop rotation have been effective in controlling weeds in the yield trial plots, but volunteer small grain has been a problem in some years, although not a severe problem in 1997.

Soil moisture was good at planting, but the site suffered from dry conditions until early July. Above normal precipitation fell during July, causing secondary tillering. Early varieties did not yield as well in general because rains came to late for them, while late maturing varieties yielded surprisingly well.

FUTURE PLANS: New varieties will continue to be tested under continuous cropping conditions to identify those which will perform best under these conditions. Closer cooperation with the Williston Research Center will allow testing of experimental lines from North Dakota as well as from Montana, so that when those lines are released as varieties, information will be available as to their performance under continuous cropping conditions.

Table 1. Agronomic data obtained from a dryland recrop spring wheat yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.
Planting date: 21 April 1998 Harvest date: 3 August 1998

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre	
ND 695	62	30	15.2	57.0	45.6	a
McNeal	62	32	14.1	57.2	38.4	
Scholar	62	31	14.9	59.3	37.7	
Amidon	62	33	14.2	57.2	37.3	
Keene	60	31	15.1	58.8	36.4	
MTHW 9420	57	27	14.9	55.0	36.0	
2375	60	30	14.9	58.3	36.0	
MT 9609	59	33	14.5	57.7	35.8	
ND 694	60	32	15.8	58.7	35.4	
Nora	60	25	15.6	57.2	35.0	
Verde	62	29	14.7	56.3	34.3	
2398	62	29	15.0	57.3	34.2	
AC Barrie	62	32	16.2	56.5	34.1	x
Hagar	61	29	15.1	56.8	33.7	x
Argent	60	31	15.7	57.3	33.6	x
Ivan	63	27	13.3	56.5	33.4	x
AC Crystal	61	31	14.2	57.3	33.2	x
Ernest	61	33	15.4	58.2	32.8	x
Kulm	57	31	15.2	60.0	32.1	x
Grandin	59	30	15.3	55.8	31.9	x
Stoa	61	31	15.6	55.7	31.9	x
Lew	62	34	15.4	57.7	31.7	x
Trenton	61	34	15.7	56.2	31.5	x
Newana	63	28	14.3	54.8	31.1	x
mean	60.7	30.5	15.03	57.2	34.6	
probability	0.000	0.000	0.000	0.000	0.000	
CV (S/mean)	1.7	4.4	2.7	1.3	7.4	
$LSD_{0.05}$	1.7	2.2	0.7	1.2	4.2	

[1] Heading date is number of days from planting

Check variety is McNeal with an average yield of 38.4 bu/a.
a indicates significantly greater than check variety, McNeal, at a probability of <0.05
x indicates significantly less than check variety, McNeal, at a probability of <0.05

Table 2. Relative yields of spring wheat varieties as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of McNeal
Scholar	--	--	14.0	32.2	37.7	28.0	111.1
ND695	--	--	--	--	42.6	42.6	110.9
McNeal	36.3	32.8	11.8	25.3	38.4	28.9	100.0
Keene	--	--	11.3	--	36.4	23.8	95.0
MT9609	--	--	--	--	35.8	35.8	93.2
ND694	--	--	--	--	35.4	35.4	92.2
Amidon	28.3	23.4	13.1	30.8	37.3	26.6	91.9
Newana	31.7	35.1	12.5	22.0	31.1	26.5	91.6
Nora	--	--	--	--	35.0	35.0	91.1
Verde	--	--	--	--	34.3	34.3	89.3
2398	--	--	--	--	34.2	34.2	89.1
AC Barrie	--	--	--	--	34.1	34.1	88.8
Hagar	--	--	--	--	33.7	33.7	87.8
Argent	--	--	--	--	33.6	33.6	87.5
2375	--	25.1	16.2	17.2	36.0	23.6	87.3
Ivan	--	--	--	--	33.4	33.4	87.0
Ernest	32.3	24.2	12.1	24.0	32.8	25.1	86.7
AC Crystal	--	--	--	--	33.2	33.2	86.5
Stoa	31.1	30.4	10.9	20.2	31.9	24.9	86.1
Kulm	36.1	20.4	13.4	--	32.1	25.5	85.5
Grandin	31.2	29.0	9.7	19.4	31.9	24.2	83.8
Lew	33.2	26.4	8.8	19.3	31.7	23.9	82.6
Trenton	--	23.8	10.8	20.5	31.5	21.6	80.0
MTHW9420	--	--	--	13.4	36.0	24.7	77.6

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 3. Relative test weights of spring wheat varieties as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of McNeal
Kulm	60.7	63.0	61.2	--	60.0	61.2	105.7
Scholar	--	--	60.3	59.7	59.3	59.8	105.3
Keene	--	--	58.0	--	58.8	58.4	103.5
2375	--	61.8	58.4	59.7	58.3	59.6	103.3
Ernest	60.5	61.2	59.8	58.3	58.2	59.6	103.1
ND694	--	--	--	--	58.7	58.7	102.6
Lew	58.3	61.8	57.9	59.2	57.7	59.0	102.0
Newana	58.8	61.3	59.4	59.7	54.8	58.8	101.7
Amidon	58.3	59.8	59.4	58.8	57.2	58.7	101.6
Trenton	--	62.6	57.2	57.9	56.2	58.5	101.5
Grandin	58.2	61.5	57.0	59.3	55.8	58.4	101.0
MT9609	--	--	--	--	57.7	57.7	100.9
2398	--	--	--	--	57.3	57.3	100.2
Argent	--	--	--	--	57.3	57.3	100.2
AC Crystal	--	--	--	--	57.3	57.3	100.2
Stoa	58.8	60.5	56.6	57.6	55.7	57.8	100.1
McNeal	58.5	60.3	55.6	57.4	57.2	57.8	100.0
Nora	--	--	--	--	57.2	57.2	100.0
MTHW9420	--	--	--	59.2	55.0	57.1	99.7
ND695	--	--	--	--	57.0	57.0	99.7
Hagar	--	--	--	--	56.8	56.8	99.3
AC Barrie	--	--	--	--	56.5	56.5	98.8
Ivan	--	--	--	--	56.5	56.5	98.8
Verde	--	--	--	--	56.3	56.3	98.4

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 heights of spring wheat varieties as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of McNeal
Amidon	30	19	27	21	33	26.0	110.2
Ernest	31	21	23	21	33	25.8	109.3
Lew	31	21	23	17	34	25.2	106.8
Trenton	--	20	24	18	34	24.0	106.7
Scholar	--	--	22	21	31	24.7	104.2
MT9609	--	--	--	--	33	33.0	103.1
Kulm	28	19	25	--	31	25.8	103.0
Keene	--	--	23	--	31	27.0	101.9
Stoa	29	21	22	17	31	24.0	101.7
McNeal	28	19	21	18	32	23.6	100.0
Grandin	26	20	25	17	30	23.6	100.0
ND694	--	--	--	--	32	32.0	100.0
AC Barrie	--	--	--	--	32	32.0	100.0
McNeal	28	19	21	18	32	23.6	100.0
Argent	--	--	--	--	31	31.0	96.9
AC Crystal	--	--	--	--	31	31.0	96.9
2375	--	19	23	15	30	21.8	96.7
Newana	25	20	24	16	28	22.6	95.8
ND695	--	--	--	--	30	30.0	93.8
Verde	--	--	--	--	29	29.0	90.6
2398	--	--	--	--	29	29.0	90.6
Hagar	--	--	--	--	29	29.0	90.6
MTHW9420	--	--	--	16	27	21.5	86.0
Ivan	--	--	--	--	27	27.0	84.4
Nora	--	--	--	--	25	25.0	78.1

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

Table 5. Relative proteins of spring wheat varieties as compared to McNeal when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of McNeal
AC Barrie	--	--	--	--	16.2	16.20	114.9
ND694	--	--	--	--	15.8	15.80	112.1
Argent	--	--	--	--	15.7	15.70	111.3
Nora	--	--	--	--	15.6	15.60	110.6
Keene	--	--	18.0	--	15.1	16.55	108.2
ND695	--	--	--	--	15.2	15.20	107.8
Hagar	--	--	--	--	15.1	15.10	107.1
2398	--	--	--	--	15.0	15.00	106.4
Kulm	15.6	17.4	17.4	--	15.2	16.40	105.5
Verde	--	--	--	--	14.7	14.70	104.3
Ernest	14.7	16.9	18.1	15.8	15.4	16.18	102.8
MT9609	--	--	--	--	14.5	14.50	102.8
MTHW9420	--	--	--	16.3	14.9	15.60	102.0
Stoa	14.5	16.1	17.9	15.9	15.6	16.00	101.7
Lew	14.1	15.6	18.7	15.9	15.4	15.94	101.3
Grandin	14.8	16.2	17.0	16.1	15.3	15.88	100.9
Trenton	--	16.4	17.5	16.0	15.7	16.40	100.8
AC Crystal	--	--	--	--	14.2	14.20	100.7
McNeal	13.6	16.7	17.8	16.5	14.1	15.74	100.0
Scholar	--	--	17.3	15.7	14.9	15.97	99.0
2375	--	16.4	16.3	16.6	14.9	16.05	98.6
Amidon	14.2	16.4	16.6	14.9	14.2	15.26	97.0
Newana	12.8	15.7	17.0	15.2	14.3	15.00	95.3
Ivan	--	--	--	--	13.3	13.30	94.3

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 6. Agronomic data obtained from a dryland recrop durum yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.
Planting date: 21 April 1998 Harvest date: 3 August 1998

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre	
Dressler	60	33	15.4	58.7	36.1	
D91080	61	27	15.5	57.7	36.1	
AC Morse	58	28	15.5	58.8	35.8	
D87450	58	27	14.7	58.0	35.5	
Renville	59	33	15.2	60.3	34.7	
Maier	59	29	16.4	59.2	34.2	
AC Melita	58	32	15.6	58.2	34.2	
Monroe	57	31	15.5	58.8	33.9	
Montrail	60	30	15.6	58.0	33.7	
Ben	60	30	16.0	59.2	33.4	
Kyle	62	35	15.7	59.0	33.0	
Plenty	61	34	15.7	58.8	33.0	
Voss	59	25	15.2	58.7	33.0	
Munich	59	28	15.8	58.3	32.8	
Kari	59	29	16.2	58.3	31.4	
Vic	60	32	15.2	60.2	30.6	x
D901518	61	29	15.6	57.5	30.2	x
Lloyd	61	24	15.5	57.2	30.1	x
Belzer	61	31	15.8	56.8	29.2	x
mean	59.6	29.7	15.59	58.5	33.2	
probability	0.000	0.000	0.001	0.000	0.010	
CV (S/mean)	1.6	4.2	2.3	1.1	7.0	
$LSD_{0.05}$	1.6	2.1	0.6	1.1	3.9	

[1] Heading date is number of days from planting

Check variety is Renville with an average yield of 34.7 bu/a.

x indicates significantly less than check variety, Renville, at a probability of <0.05

Table 7. Relative yields of durum varieties compared to Renville when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Renville
Dressler	--	--	13.6	25.7	36.1	25.1	108.0
Kyle	35.1	28.6	15.5	31.7	33.0	28.8	105.7
D91080	--	--	--	--	36.1	36.1	104.0
AC Morse	--	--	--	--	35.8	35.8	103.2
Plenty	36.0	30.2	13.7	25.7	33.0	27.7	101.8
Ben	--	--	14.6	23.0	33.4	23.7	101.7
Vic	31.9	35.8	12.6	25.4	30.6	27.3	100.1
Renville	31.0	35.4	13.8	21.3	34.7	27.2	100.0
Maier	--	--	--	--	34.2	34.2	98.6
AC Melita	--	--	--	--	34.2	34.2	98.6
Montrail	--	--	--	--	33.7	33.7	97.1
D87450	--	--	11.5	--	35.5	23.5	96.9
Voss	--	33.4	13.1	22.2	33.0	25.4	96.7
Munich	--	32.3	13.8	21.6	32.8	25.1	95.5
Monroe	28.9	34.3	14.2	15.7	33.9	25.4	93.2
Kari	--	--	--	--	31.4	31.4	90.9
Lloyd	23.1	33.2	13.5	20.4	30.1	24.1	88.3
D901518	--	--	--	--	30.2	30.2	87.0
Belzer	--	--	--	--	29.2	29.2	84.1

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 8. Relative test weights of durum varieties as compared to Renville when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Renville
Voss	--	62.3	61.5	60.0	58.7	60.6	100.5
Ben	--	--	61.7	59.9	59.2	60.3	100.5
Vic	59.5	61.2	59.4	59.2	60.2	59.9	100.2
Renville	57.8	61.3	60.0	59.6	60.3	59.8	100.0
Kyle	58.5	61.0	60.6	58.7	59.0	59.6	99.6
Monroe	58.8	60.3	59.7	59.9	58.8	59.5	99.5
Plenty	58.3	61.2	59.7	58.3	58.8	59.3	99.1
Dressler	--	--	60.8	58.8	58.7	59.4	99.1
Munich	--	61.2	59.7	59.7	58.3	59.7	99.0
Maier	--	--	--	--	59.2	59.2	98.2
Lloyd	54.3	62.0	59.7	59.4	57.2	58.5	97.9
AC Morse	--	--	--	--	58.8	58.8	97.5
D87450	--	--	58.3	--	58.0	58.2	96.7
Kari	--	--	--	--	58.3	58.3	96.7
AC Melita	--	--	--	--	58.2	58.2	96.5
Montrail	--	--	--	--	58.0	58.0	96.2
D91080	--	--	--	--	57.7	57.7	95.7
D901518	--	--	--	--	57.5	57.5	95.4
Belzer	--	--	--	--	56.8	56.8	94.2

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.

Table 9. Relative heights of durum varieties as compared to Renville when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Renville
Kyle	35	31	24	21	35	29.2	110.6
Plenty	32	27	28	19	34	28.0	106.1
Vic	30	28	26	21	32	27.4	103.8
Dressler	--	--	24	18	33	25.0	101.4
Renville	30	28	24	17	33	26.4	100.0
Ben	--	--	23	17	30	23.3	94.6
Monroe	27	26	24	17	31	25.0	94.7
D87450	--	--	22	--	26	24.0	84.2
Munich	--	25	21	14	28	22.0	86.3
Voss	--	24	20	15	25	21.0	82.4
Lloyd	25	22	19	16	24	21.2	80.3
D91080	--	--	--	--	27	27.0	81.8
AC Morse	--	--	--	--	28	28.0	84.8
Maier	--	--	--	--	29	29.0	87.9
AC Melita	--	--	--	--	31	31.0	93.9
Montrail	--	--	--	--	30	30.0	90.9
Kari	--	--	--	--	29	29.0	87.9
D901518	--	--	--	--	29	29.0	87.9
Belzer	--	--	--	--	31	31.0	93.9

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

Table 10. Relative protein contents of durum varieties as compared to Renville when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Renville
Maier	--	--	--	--	16.4	16.40	107.9
Kari	--	--	--	--	16.2	16.20	106.6
Belzer	--	--	--	--	15.8	15.80	103.9
Kyle	15.5	19.5	19.7	15.0	15.7	17.08	103.8
AC Melita	--	--	--	--	15.6	15.60	102.6
Montrail	--	--	--	--	15.6	15.60	102.6
D901518	--	--	--	--	15.6	15.60	102.6
D91080	--	--	--	--	15.5	15.50	102.0
AC Morse	--	--	--	--	15.5	15.50	102.0
Dressler	--	--	19.7	15.6	15.4	16.90	100.8
Vic	15.8	16.6	19.7	15.1	15.2	16.48	100.1
Plenty	15.5	17.1	18.8	15.3	15.7	16.48	100.1
Renville	14.9	17.1	19.7	15.4	15.2	16.46	100.0
Ben	--	-	19.1	15.2	16.0	16.77	100.0
Munich	--	16.5	19.5	15.2	15.8	16.75	99.4
Monroe	14.8	16.2	17.8	15.5	15.5	15.96	97.0
Lloyd	15.0	15.3	18.8	15.2	15.5	15.96	97.0
Voss	--	15.8	18.3	14.6	15.2	15.98	94.8
D87450	--	--	17.6	--	14.7	16.15	92.6

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.

Table 11. Agronomic data obtained from a dryland recrop barley yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT.
Planting date: 21 April 1998 Harvest date: 27 July 1998

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre	
Chinook	60	27	11.3	48.5	62.8	
MT920073	59	26	11.0	50.3	61.7	
Gallatin	60	28	10.3	50.2	59.3	
MT910150	61	28	11.0	51.7	59.0	
Hector	60	29	11.3	49.7	58.4	
Lewis	61	27	11.1	50.8	58.1	
MT910189	60	27	10.3	49.2	57.9	
MTLB 57	60	24	10.9	51.0	56.3	
Logan	59	26	11.0	48.8	55.8	
Stark	57	30	10.4	51.8	55.8	
MTLB 6	62	26	11.5	51.5	55.7	
MTLB 5	63	25	10.8	51.3	54.9	
MTLB 32	62	26	10.9	50.5	53.7	
Bowman	57	27	11.3	50.5	53.5	
Harrington	63	25	10.8	46.2	52.6	
Baronesse	63	23	11.0	48.7	49.7	x
mean	60.4	26.5	10.93	50.0	56.6	
probability	0.01	0.01	0.05	0.01	0.05	
CV (S/mean)	0.5	6.2	2.3	1.8	7.2	
$LSD_{0.05}$	1.3	2.7	0.7	1.5	6.7	

[1] Heading date is number of days from planting

Check variety is Gallatin with an average yield of 59.3 bu/a.
x indicates significantly less than check variety, Gallatin, at a probability of <0.05

Table 12. Relative yields of barley varieties compared to Gallatin when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Gallatin
MT920073	--	--	--	--	61.7	61.7	104.0
Gallatin	36.9	62.9	15.9	46.4	59.3	44.3	100.0
Hector	41.5	57.7	18.8	44.0	58.4	44.1	99.5
MT910150	--	--	--	--	59.0	59.0	99.5
Lewis	40.7	59.9	16.4	42.3	58.1	43.5	98.2
Stark	42.0	61.0	19.6	38.1	55.8	43.3	97.8
MT910189	--	--	--	--	57.9	57.9	97.6
Chinook	35.3	57.5	17.2	39.9	62.8	42.5	96.1
Bowman	38.8	57.9	23.2	39.0	53.5	42.5	95.9
Baronesse	39.0	55.0	18.5	48.1	49.7	42.1	95.0
MTLB 57	--	--	--	--	56.3	56.3	94.9
MTLB 6	--	--	--	--	55.7	55.7	93.9
MTLB 5	--	--	--	--	54.9	54.9	92.6
Harrington	31.7	57.2	15.8	45.0	52.6	40.5	91.4
MTLB 32	--	--	--	--	53.7	53.7	90.6
Logan	--	--	16.4	34.8	55.8	35.7	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.

Table 13. Relative test weights of barley varieties compared to Gallatin when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Gallatin
MT910150	--	--	--	--	51.7	51.7	103.0
MTLB 6	--	--	--	--	51.5	51.5	102.6
Stark	50.2	50.2	48.1	50.5	51.8	50.2	102.4
MTLB 5	--	--	--	--	51.3	51.3	102.2
Bowman	49.3	50.5	49.8	50.0	50.5	50.0	102.1
MTLB 57	--	--	--	--	51.0	51.0	101.6
Logan	--	--	48.5	51.3	48.8	49.5	101.3
Lewis	48.3	50.2	48.2	50.0	50.8	49.5	101.0
MTLB 32	--	--	--	--	50.5	50.5	100.6
MT920073	--	--	--	--	50.3	50.3	100.2
Gallatin	48.0	50.3	46.2	50.3	50.2	49.0	100.0
Hector	48.2	50.0	46.5	50.2	49.7	48.9	99.8
Baronesse	48.0	49.3	47.4	49.5	48.7	48.6	99.1
Chinook	48.1	50.0	47.1	48.3	48.5	48.4	98.8
MT910189	--	--	--	--	49.2	49.2	98.0
Harrington	47.0	49.2	46.2	47.5	46.2	47.2	96.4

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 14. Relative heights of barley varieties compared to Gallatin when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Gallatin
Hector	23	20	20	19	29	22.2	101.8
Gallatin	22	22	19	18	28	21.8	100.0
Stark	23	20	19	17	30	21.8	100.0
MT910150	--	--	--	--	28	28.0	100.0
MT910189	--	--	--	--	27	27.0	96.4
Bowman	22	19	19	17	27	20.8	95.4
Lewis	22	17	18	19	27	20.6	94.5
Chinook	22	19	17	17	27	20.4	93.6
MT920073	--	--	--	--	26	26.0	92.9
MTLB 6	--	--	--	--	26	26.0	92.9
MTLB 32	--	--	--	--	26	26.0	92.9
Harrington	21	19	18	18	25	20.2	92.7
Logan	--	--	18	16	26	20.0	92.3
MTLB 5	--	--	--	--	25	25.0	89.3
Baronesse	20	17	17	18	23	19.0	87.2
MTLB 57	--	--	--	--	24	24.0	85.7

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

Table 15. Relative protein contents of barley varieties compared to Gallatin when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Gallatin
MTLB 6	--	--	--	--	11.5	11.50	111.7
MT910150	--	--	--	--	11.0	11.00	106.8
MT920073	--	--	--	--	11.0	11.00	106.8
MTLB 57	--	--	--	--	10.9	10.90	105.8
MTLB 32	--	--	--	--	10.9	10.90	105.8
MTLB 5	--	--	--	--	10.8	10.80	104.9
Baronesse	13.3	13.6	15.4	12.3	11.0	13.12	104.5
Chinook	12.6	12.9	15.3	12.7	11.3	12.96	103.2
Lewis	12.5	12.8	14.9	12.9	11.1	12.84	102.2
Hector	12.6	13.0	14.8	12.3	11.3	12.80	101.9
Harrington	12.5	13.0	15.1	12.5	10.8	12.78	101.8
Gallatin	12.2	12.7	15.1	12.5	10.3	12.56	100.0
MT910189	--	--	--	--	10.3	10.30	100.0
Logan	--	--	13.8	12.6	11.0	12.47	98.7
Bowman	12.0	12.6	12.9	12.5	11.3	12.26	97.6
Stark	11.0	12.4	13.1	12.4	10.4	11.86	94.4

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 16. Agronomic data obtained from a dryland recrop oat yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT, 1995.
Planting date: 21 April 1998 Harvest date: 31 July 1998

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre	
Otana	63	35	11.1	33.0	103.8	
Rio Grande	60	29	11.2	30.5	102.9	
ND860416	65	34	11.0	31.2	98.1	
86AB4582	62	30	10.7	30.2	98.0	
Whitestone	64	28	10.8	30.3	97.7	
Monida	64	32	11.1	28.2	95.9	
Prairie	59	29	10.6	30.0	94.2	
ABSP 9-2	62	28	11.3	31.3	93.4	
86AB664	63	29	10.4	29.3	92.5	x
87AB5125	63	25	11.2	29.8	91.0	x
Powell	64	27	11.4	28.0	88.1	x
90AB1322	63	25	11.4	28.5	85.6	x
Ajay	63	23	12.4	30.0	82.0	x
Celcia	65	31	11.0	29.7	81.9	x
mean	62.8	28.9	11.12	30.0	93.2	
probability	0.000	0.000	0.000	0.000	0.003	
CV (S/mean)	0.4	4.9	3.4	2.5	6.9	
$LSD_{0.05}$	1.1	2.4	0.6	1.2	10.7	

[1] Heading date is number of days from planting

Check variety is Otana with an average yield of 103.8 bu/a.
x indicates significantly less than check variety, Otana, at a probability of <0.05

Table 17. Relative yields of oat varieties compared to Otana when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Otana
Monida	64.4	91.6	37.2	93.5	95.9	76.5	100.4
Otana	62.9	86.7	44.3	83.5	103.8	76.2	100.0
Rio Grande	78.1	80.6	41.0	72.5	102.9	75.0	98.4
Whitestone	66.1	91.3	31.5	87.5	97.7	74.8	98.1
90AB1322	78.8	88.4	30.3	83.6	85.6	73.3	96.2
87AB5125	--	--	--	88.8	91.0	89.9	96.0
86AB664	--	--	--	83.4	92.5	88.0	93.9
Celcia	--	--	--	92.7	81.9	87.3	93.2
ND860416	--	--	29.8	85.1	98.1	71.0	92.0
86AB4582	--	--	34.3	80.2	98.0	70.8	91.8
Powell	--	82.1	41.8	77.7	88.1	72.4	91.0
ABSP 9-2	--	--	--	74.9	93.4	84.2	89.9
Prairie	--	--	--	74.2	94.2	84.2	89.9
Ajay	62.6	80.1	38.5	70.4	82.0	66.7	87.5

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.

Table 18. Relative test weights of oat varieties as compared to Otana when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Otana
Otana	41.3	38.8	33.6	32.8	33.0	35.9	100.0
ND860416	--	--	31.3	32.5	31.2	31.7	95.6
ABSP 9-2	--	--	--	31.5	31.3	31.4	95.4
Whitestone	40.2	37.0	29.8	31.5	30.3	33.8	94.0
Ajay	36.3	38.3	31.3	31.0	30.0	33.4	93.0
Rio Grande	35.8	38.3	29.5	30.8	30.5	33.0	91.9
87AB5125	--	--	--	30.7	29.8	30.2	91.9
Monida	35.7	38.5	30.2	31.8	28.2	32.9	91.6
86AB664	--	--	--	31.0	29.3	30.2	91.6
Prairie	--	--	--	30.2	30.0	30.1	91.5
86AB4582	--	--	29.4	31.3	30.2	30.3	91.4
Celcia	--	--	--	29.5	29.7	29.6	90.0
90AB1322	34.6	39.5	28.4	29.7	28.5	32.1	89.5
Powell	--	37.0	27.1	29.7	28.0	30.4	88.1

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 19. Relative heights of oat varieties as compared to Otana when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Otana
Otana	34	30	27	27	35	30.6	100.0
ND860416	--	--	24	28	34	28.7	96.6
Celcia	--	--	--	28	31	29.5	95.2
Monida	31	26	20	27	32	27.2	88.9
86AB4582	--	--	23	24	30	25.7	86.5
Prairie	--	--	--	24	29	26.5	85.5
86AB664	--	--	--	24	29	26.5	85.5
Whitestone	30	24	21	23	28	25.2	82.4
ABSP 9-2	--	--	--	23	28	25.5	82.3
Rio Grande	26	23	20	20	29	23.6	77.1
87AB5125	--	--	--	22	25	23.5	75.8
Powell	--	22	18	20	27	21.8	73.1
90AB1322	25	20	18	21	25	21.8	71.2
Ajay	23	18	14	19	23	19.4	63.4

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

Table 20. Relative protein contents of oat varieties as compared to Otana when grown under dryland continuous cropping at the EARC, Sidney, Montana.

Cultivar	1994	1995	1996	1997	1998	Ave	as % of Otana
Ajay	13.4	13.8	10.7	13.6	12.4	12.78	108.7
Rio Grande	12.9	13.0	10.9	13.2	11.2	12.24	104.1
Powell	--	12.0	10.5	12.7	11.4	11.65	101.5
90AB1322	12.5	12.8	10.3	12.4	11.4	11.88	101.0
86AB4582	--	--	10.7	11.9	10.7	11.10	100.6
Otana	12.9	12.8	9.3	12.7	11.1	11.76	100.0
ND860416	--	--	9.6	12.3	11.0	10.97	99.4
Prairie	--	--	--	12.9	10.6	11.75	98.7
87AB5125	--	--	--	12.1	11.2	11.65	97.9
Monida	12.6	12.6	9.4	11.7	11.1	11.48	97.6
ABSP 9-2	--	--	--	11.8	11.3	11.55	97.1
Whitestone	12.2	12.3	9.9	11.7	10.8	11.38	96.8
Celcia	--	--	--	11.6	11.0	11.30	95.0
86AB664	--	--	--	11.8	10.4	11.10	93.3

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.