PROJECT TITLE: Evaluation of spring wheat, durum, barley, and oat varieties under minimum-till, continuous cropping conditions – 1997

PROJECT LEADER:
Joyce Eckhoff
Eastern Agricultural Research Center
1501 N Central Ave
Sidney, MT 59270
phone: (406)482-2208 fax: (406)482-7336 e-mail: jeckhoff@sidney.ars.usda.gov

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 1996, safflower in 1995, and small grain in 1994. Residual soil N was 62 lb/acre to three feet and residual soil P was 59 ppm to six inches. Twenty lb N/acre in the form of liquid 28-0-0 was broadcast and incorporated on 16 April 1997. 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	18 April	20 August
Durum	18 April	20 August
Barley	18 April	20 August
Oats	17 April	12 August

RESULTS:

Spring wheat: Twenty-three lines and varieties of spring wheat were tested under dryland recrop conditions (Table 1). Montana line MT9433, Amidon, and McNeal yielded the most. Average yield was 19.5 bu/acre. Five-year summaries for yield, test weight, height, and protein content are shown in Tables 2 through 5.

Durum: Twenty durum varieties were tested under dryland recrop conditions (Table 6). Kyle and Dressler were the highest yielding durums. Average yield was 21.5 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). Montana experimental line HR851195 and Baronesse yielded the most. Average yield was 39.4 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). Monida and Celcia yielded the most. Average yield was 82.0 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: 18 April 1997 Harvest date: 20 August 1997

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre
MT 9433	59	21	15.7	59.7	32.2a
Amidon	58	21	14.9	58.8	30.8a
McNeal	59	18	16.5	57.4	25.3
Ernest	58	21	15.8	58.3	24.0
Vanna	58	15	13.7	56.9	23.7
Glenman	58	18	15.2	57.8	22.7
Len	59	18	15.8	57.0	22.2
Newana	59	16	15.2	59.7	22.0
MTHW9520	57	18	15.6	58.6	21.8
Rambo	59	17	15.3	60.1	21.4x
Trenton	58	18	16.0	57.9	20.5x
Stoa	58	17	15.9	57.6	20.2x
Grandin	57	17	16.1	59.3	19.4x
Lew	59	17	15.9	59.2	19.3x
2375	56	15	16.6	59.7	17.2x
Fergus	56	17	16.2	61.5	16.7x
Westbred 936	55	15	16.8	59.4	13.7x
Westbred 926	55	15	16.6	59.6	13.6x
MTHW9420	56	16	16.3	59.2	13.4x
Hi-Line	56	17	17.6	60.2	13.2x
Express	57	13	16.8	59.3	12.6x
MT 9508	56	15	17.1	58.8	12.0x
Fortuna	56	17	17.2	56.8	9.7x
mean	57.4	17.1	16.03	58.8	19.5
CV (S/mean)	0.3	11.6	1.9	1.7	10.9
$LSD_{0.05}$	0.8	3.3	0.5	1.6	3.5

[1] Heading date is number of days from planting

Check variety is McNeal with an average yield of 25.3 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	# of years	1993	1994	1995	1996	1997	Ave	as % of McNeal
MT9433	2	--	--	--	14.0	32.2	23.1	124.5
McNeal	5	38.2	36.3	32.8	11.8	25.3	28.9	100.0
Keene	1	--	--	--	11.3	--	11.3	95.8
Vanna	2	--	--	30.5	--	23.7	27.1	94.9
Glenman	4	27.6	31.5	28.9	--	22.7	27.7	92.9
Newana	5	30.3	31.7	35.1	12.5	22.0	26.3	91.1
Rambo	4	28.0	33.4	24.0	--	21.4	26.7	89.7
Amidon	5	33.6	28.3	23.4	13.1	30.8	25.8	89.5
Len	4	27.3	29.1	26.7	--	22.2	26.3	88.4
Ernest	4	--	32.3	24.2	12.1	24.0	23.2	87.2
Kulm	3	--	36.1	20.4	13.4	--	23.3	86.4
MTHW9520	1	--	--	--	--	21.8	21.8	86.2
2375	3	--	--	25.1	16.2	17.2	19.5	83.7
Stoa	5	27.9	31.1	30.4	10.9	20.2	24.1	83.4
Grandin	5	29.1	31.2	29.0	9.7	19.4	23.7	82.2
Lew	5	30.0	33.2	26.4	8.8	19.3	23.5	81.5
Hi-Line	5	30.8	32.7	28.0	10.9	13.2	23.1	80.1
Trenton	3	--	--	23.8	10.8	20.5	18.4	78.8
Westbred 926	5	24.2	33.1	29.2	13.2	13.6	22.7	78.5
Westbred 936	3	--	--	23.2	13.8	13.7	16.9	72.5
Fergus	2	--	--	23.1	--	16.7	19.7	69.7
Express	3	--	--	23.0	12.2	12.6	15.9	68.4
Fortuna	4	20.2	28.2	19.3	--	9.7	19.4	65.0
MTHW9420	1	--	--	--	--	13.4	13.4	53.0
MT9508	1	--	--	--	--	12.0	12.0	47.4

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	# of years	1993	1994	1995	1996	1997	Ave	as % of McNeal
MT9433	2	--	--	--	60.3	59.7	60.0	106.2
Kulm	3	--	60.7	63.0	61.2	--	61.6	106.0
Fergus	2			61.9	--	61.5	61.7	104.8
Keene	1	--	--	--	58.0	--	58.0	104.3
2375	3	--	--	61.8	58.4	59.7	60.0	103.8
Ernest	4	--	60.5	61.2	59.8	58.3	60.0	103.5
Westbred 936	3	--	--	61.5	58.3	59.4	59.7	103.4
MTHW9420	1	--	--	--	--	59.2	59.2	103.1
Trenton	3	--	--	62.6	57.2	57.9	59.2	102.5
MT9508	1	--	--	--	--	58.8	58.8	102.4
Hi-Line	5	56.5	60.3	60.8	56.8	60.2	58.9	102.2
MTHW9520	1	--	--	--	--	58.6	58.6	102.1
Express	3	--	--	60.6	56.8	59.3	58.9	102.0
Newana	5	54.7	58.8	61.3	59.4	59.7	58.8	101.9
Lew	5	55.3	58.3	61.8	57.9	59.2	58.5	101.5
Rambo	4	54.5	60.3	61.4	--	60.1	59.1	101.5
Grandin	5	56.0	58.2	61.5	57.0	59.3	58.4	101.3
Westbred 926	5	54.0	59.2	60.7	58.5	59.6	58.4	101.3
Amidon	5	53.7	58.3	59.8	59.4	58.8	58.0	100.6
McNeal	5	56.5	58.5	60.3	55.6	57.4	57.7	100.0
Vanna	2	--	--	60.3	--	56.9	58.6	99.6
Stoa	5	53.2	58.8	60.5	56.6	57.6	57.3	99.4
Len	4	54.0	59.0	61.3	--	57.0	57.8	99.4
Fortuna	4	52.8	60.0	59.5	--	56.8	57.3	98.5
Glenman	4	50.7	58.2	60.5	--	57.8	56.8	97.6

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

Cultivar	# of years	1993	1994	1995	1996	1997	Ave	as % of McNeal
Ernest	4	--	31	21	23	21	24.0	111.6
MT9433	2	--	--	--	22	21	21.5	110.3
Amidon	5	28	30	19	27	21	25.0	109.6
Keene	1	--	--	--	23	--	23.0	109.5
Trenton	3	--	--	20	24	18	20.7	106.9
Fortuna	4	30	30	22	--	17	24.8	106.5
Lew	5	29	31	21	23	17	24.2	106.1
Kulm	3	--	28	19	25	--	24.0	105.9
Stoa	5	29	29	21	22	17	23.6	103.5
Grandin	5	28	26	20	25	17	23.2	101.8
Glenman	4	28	28	20	--	18	23.5	101.1
McNeal	5	28	28	19	21	18	22.8	100.0
MTHW9520	1	--	--	--	--	18	18.0	100.0
Len	4	27	27	20	--	18	23.0	98.9
2375	3	--	--	19	23	15	19.0	98.3
Newana	5	25	25	20	24	16	22.0	96.5
Hi-Line	5	25	27	17	23	17	21.8	95.6
Fergus	2	--	--	18	--	17	17.5	94.6
Westbred 936	3	--	--	18	21	15	18.0	93.1
Westbred 926	5	25	25	18	21	15	20.8	91.2
Rambo	4	25	26	16	--	17	21.0	90.3
Vanna	2	--	--	18	--	15	16.5	89.2
MTHW9420	1	--	--	--	--	16	16.0	88.9
Express	3	--	--	15	21	13	16.3	84.5
MT9508	1	--	--	--	--	15	15.0	83.3

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	# of years	1993	1994	1995	1996	1997	Ave	as % of McNeal
Fortuna	4	16.5	13.7	17.4	--	17.2	16.20	109.1
Fergus	2	--	--	17.0	--	16.2	16.60	107.4
Len	4	17.1	13.8	16.4	--	15.8	15.78	106.2
Kulm	3	--	15.6	17.4	17.4	--	16.8	104.8
MT9508	1	--	--	--	--	17.1	17.10	103.6
Hi-Line	5	16.7	14.2	16.9	18.4	17.6	16.76	103.1
Westbred 936	3	--	--	17.5	17.8	16.8	17.37	102.2
Ernest	4	--	14.7	16.9	18.1	15.8	16.38	101.4
Rambo	4	16.1	13.1	15.7	--	15.3	15.05	101.3
Keene	1	--	--	--	18.0	--	18.00	101.1
Stoa	5	17.3	14.5	16.1	17.9	15.9	16.34	100.5
Westbred 926	5	16.6	13.7	16.6	18.1	16.6	16.32	100.4
Express	3	--	--	17.4	17.0	16.8	17.07	100.4
Lew	5	17.2	14.1	15.6	18.7	15.9	16.30	100.2
McNeal	5	16.7	13.6	16.7	17.8	16.5	16.26	100.0
Glenman	4	16.3	13.1	14.8	--	15.2	14.85	100.0
Grandin	5	16.9	14.8	16.2	17.0	16.1	16.20	99.6
MTHW9420	1	--	--	--	--	16.3	16.30	98.8
Trenton	3	--	--	16.4	17.5	16.0	16.63	97.8
Amidon	5	16.6	14.2	16.4	16.6	14.9	15.74	96.8
2375	3	--	--	16.4	16.3	16.6	16.43	96.7
MT9433	2	--	--	--	17.3	15.7	16.50	96.2
MTHW9520	1	--	--	--	--	15.6	15.60	94.5
Newana	5	15.7	12.8	15.7	17.0	15.2	15.28	94.0
Vanna	2	--	--	13.4	--	13.7	13.55	87.7

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.

Table 6. Agronomic data obtained from a dryland recrop durum yield trial conducted at the Eastern Agricultural Research Center, Sidney, MT, 1995.
Planting date: 18 April 1997 Harvest date: 20 August 1997

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre
Kyle	60	21	15.0	58.7	31.7a
McNeal	59	17	16.0	56.5	26.0a
Dressler	59	18	15.6	58.8	25.7a
Plenty	58	19	15.3	58.3	25.7a
Vic	58	21	15.1	59.2	25.4a
Medora	57	18	15.2	59.1	24.6a
Laker	59	16	13.9	59.3	23.4
Ben	58	17	15.2	59.9	23.0
Ward	57	17	14.6	60.2	22.5
Voss	58	15	14.6	60.0	22.2
Munich	58	14	15.2	59.7	21.6
Renville	58	17	15.4	59.6	21.3
Lloyd	59	16	15.2	59.4	20.4
Durfort	57	13	15.2	59.4	16.6x
Gold Cup	57	15	14.6	60.3	16.5x
933	56	15	16.2	59.5	16.3x
Monroe	56	17	15.5	59.9	15.7x
Kronos	55	14	15.1	59.8	13.8x
WPB 1	56	16	16.4	58.2	13.7x
mean	57.7	16.6	15.2	59.2	21.5
CV (S/mean)	0.3	9.7	2.8	1.5	9.1
LSD 0.05	0.8	2.6	0.7	1.5	3.2

[1] Heading date is number of days from planting

Check variety is Renville with an average yield of 21.3 bu/a.
a indicates significantly greater than check variety, Renville, at a probability of <0.05
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	# of years	1993	1994	1995	1996	1997	Ave	as % of Renville
Dressler	2	--	--	--	13.6	25.7	19.6	112.0
Kyle	4	--	35.1	28.6	15.5	31.7	27.7	109.3
Plenty	5	27.7	36.0	30.2	13.7	25.7	26.7	107.8
Ben	2	--	--	--	14.6	23.0	18.8	107.1
Vic	5	21.9	31.9	35.8	12.6	25.4	25.5	103.2
Renville	5	22.1	31.0	35.4	13.8	21.3	24.7	100.0
Medora	5	20.2	32.6	29.7	13.5	24.6	24.1	97.6
Voss	3	--	--	33.4	13.1	22.2	22.9	97.4
Ward	5	23.0	31.3	28.9	14.5	22.5	24.0	97.2
Munich	3	--	--	32.3	13.8	21.6	22.6	96.0
Monroe	5	24.4	28.9	34.3	14.2	15.7	23.5	95.1
Laker	5	19.0	28.2	31.5	15.1	23.4	23.4	94.8
Lloyd	5	20.7	23.1	33.2	13.5	20.4	22.2	89.7
Cortez	1	--	--	--	11.8	--	11.8	85.5
D87450	1	--	--	--	11.5	--	11.5	83.3
Durfort	1	--	--	--	--	16.6	16.6	77.9
Gold Cup	1	--	--	--	--	16.5	16.5	77.5
933	1	--	--	--	--	16.3	16.3	76.5
Kronos	1	--	--	--	--	13.8	13.8	64.8
WPB1	1	--	--	--	--	13.7	13.7	64.3

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	# of years	1993	1994	1995	1996	1997	Ave	as % of Renville
Ben	2	--	--	--	61.7	59.9	60.8	101.7
Voss	3	--	--	62.3	61.5	60.0	61.3	101.6
Gold Cup	1	--	--	--	--	60.3	60.3	101.2
Medora	5	54.1	60.3	61.5	61.1	59.1	59.2	100.7
Ward	5	54.3	60.2	60.5	60.8	60.2	59.2	100.6
Kronos	1	--	--	--	--	59.8	59.8	100.3
Renville	5	55.4	57.8	61.3	60.0	59.6	58.8	100.0
Monroe	5	55.3	58.8	60.3	59.7	59.9	58.8	100.0
Kyle	4	--	58.5	61.0	60.6	58.7	59.7	100.0
Dressler	2	--	--	--	60.8	58.8	59.8	100.0
Munich	3	--	--	61.2	59.7	59.7	60.2	99.8
933	1	--	--	--	--	59.5	59.5	99.8
Vic	5	53.8	59.5	61.2	59.4	59.2	58.6	99.7
Durfort	1	--	--	--	--	59.4	59.4	99.7
Laker	5	52.9	57.5	61.7	61.2	59.3	58.5	99.5
Plenty	5	54.5	58.3	61.2	59.7	58.3	58.4	99.3
Cortez	1	--	--	--	59.6	--	59.6	99.3
Lloyd	5	53.7	54.3	62.0	59.7	59.4	57.8	98.3
WPB1	1	--	--	--	--	58.2	58.2	97.7
D87450	1	--	--	--	58.3	--	58.3	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.

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

Cultivar	# of years	1993	1994	1995	1996	1997	Ave	as % of Renville
Kyle	4	--	35	31	24	21	27.8	112.1
Plenty	5	29	32	27	28	19	27.0	105.5
Vic	5	29	30	28	26	21	26.8	104.7
Medora	5	30	31	28	25	18	26.4	103.1
Dressler	2	--	--	--	24	18	21.0	102.4
Renville	5	29	30	28	24	17	25.6	100.0
Ward	5	29	29	27	24	17	25.2	98.4
Ben	2	--	--	--	23	17	20.0	97.6
Monroe	5	29	27	26	24	17	24.6	96.1
Laker	5	27	29	26	23	16	24.2	94.5
WPB1	1	--	--	--	--	16	16.0	94.1
D87450	1	--	--	--	22	--	22.0	91.7
Gold Cup	1	--	--	--	--	15	15.0	88.2
933	1	--	--	--	--	15	15.0	88.2
Munich	3	--	--	25	21	14	20.0	87.0
Voss	3	--	--	24	20	15	19.7	85.5
Lloyd	5	25	25	22	19	16	21.4	83.6
Kronos	1	--	--	--	--	14	14.0	82.4
Cortez	1	--	--	--	19	--	19.0	79.2
Durfort	1	--	--	--	--	13	13.0	76.5

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	# of years	1993	1994	1995	1996	1997	Ave	as % of Renville
WPB1	1	--	--	--	--	16.4	16.40	106.5
933	1	--	--	--	--	16.2	16.20	105.2
Kyle	4	--	15.5	19.5	19.7	15.0	17.43	103.9
Dressler	3	--	--	--	19.7	15.6	17.65	100.6
Renville	5	16.0	14.9	17.1	19.7	15.4	16.62	100.0
Vic	5	15.5	15.8	16.6	19.7	15.1	16.54	99.5
Medora	5	16.1	15.0	16.8	19.5	15.2	16.52	99.4
Cortez	1	--	--	--	19.5	--	19.50	99.0
Plenty	5	15.4	15.5	17.1	18.8	15.3	16.42	98.8
Ward	5	16.0	15.8	17.2	18.4	14.6	16.40	98.7
Durfort	1	--	--	--	--	15.2	15.20	98.7
Munich	3	--	--	16.5	19.5	15.2	17.07	98.1
Kronos	1	--	--	--	--	15.1	15.10	98.1
Ben	2	--	--	-	19.1	15.2	17.15	97.7
Monroe	5	16.6	14.8	16.2	17.8	15.5	16.18	97.4
Lloyd	5	14.6	15.0	15.3	18.8	15.2	15.78	94.9
Gold Cup	1	--	--	--	--	14.6	14.60	94.8
Voss	3	--	--	15.8	18.3	14.6	16.23	93.3
Laker	5	15.5	13.8	15.2	18.2	13.9	15.32	92.2
D87450	1	--	--	--	17.6	--	17.60	89.3

NOTE: Average protein contents in this summary should not be compared to each other since they are not grown in the same years. Compare 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, 1995.
Planting date: 18 April 1997 Harvest date: 20 August 1997

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre
H1851195	62	18	12.2	47.5	50.6
Baronesse	64	18	12.3	49.5	48.1
MT886610	62	19	12.4	49.2	47.0
Gallatin	60	18	12.5	50.3	46.4
Harrington	63	18	12.5	47.5	45.0
Hector	63	19	12.3	50.2	44.0
H3860224	63	18	12.8	48.5	42.5
Lewis	62	19	12.9	50.0	42.3
Targhee	63	18	12.4	49.2	42.2
Chinook	62	17	12.7	48.3	39.9
Bowman	58	17	12.5	50.0	39.0
Stark	57	17	12.4	50.5	38.1x
Logan	57	16	12.6	51.3	34.8x
Steptoe	57	15	11.7	44.8	27.8x
Stander	58	11	13.0	50.2	23.0x
Foster	57	12	12.5	48.9	19.2x
mean	60.5	17.1	12.5	49.1	39.4
CV (S/mean)	0.6	8.4	3.4	2.0	12.0
LSD 0.05	1.7	2.4	NS	1.6	7.9

[1] Heading date is number of days from planting

Check variety is Gallatin with an average yield of 46.4 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	# of years	1993	1994	1995	1996	1997	Ave	as % of Gallatin
H1851195	2	--	--	--	20.4	50.6	35.5	114.0
Baronesse	5	52.6	39.0	55.0	18.5	48.1	42.6	105.5
MT886610	2	--	--	--	17.0	47.0	32.0	102.7
Gallatin	5	39.9	36.9	62.9	15.9	46.4	40.4	100.0
Hector	5	40.0	41.5	57.7	18.8	44.0	40.4	100.0
Targhee	3	--	--	67.2	15.3	42.2	41.6	99.6
Lewis	5	41.1	40.7	59.9	16.4	42.3	40.1	99.2
Harrington	5	42.9	31.7	57.2	15.8	45.0	38.5	95.3
H3860224	2	--	--	--	16.3	42.5	29.4	94.4
Chinook	5	39.8	35.3	57.5	17.2	39.9	37.9	93.9
Stark	5	23.7	42.0	61.0	19.6	38.1	36.9	91.3
Bowman	5	21.7	38.8	57.9	23.2	39.0	36.1	89.4
Steptoe	5	36.0	36.9	56.0	15.8	27.8	34.5	85.4
Logan	2	--	--	--	16.4	34.8	25.6	82.2
Stander	2	--	--	--	16.7	23.0	19.9	63.7
Foster	1	--	--	--	--	19.2	19.2	41.4

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	# of years	1993	1994	1995	1996	1997	Ave	as % of Gallatin
Logan	2	--	--	--	48.5	51.3	49.9	103.4
Stark	5	47.0	50.2	50.2	48.1	50.5	49.2	101.9
Bowman	5	45.7	49.3	50.5	49.8	50.0	49.1	101.6
Lewis	5	47.7	48.3	50.2	48.2	50.0	48.9	101.2
Gallatin	5	46.7	48.0	50.3	46.2	50.3	48.3	100.0
Baronesse	5	47.0	48.0	49.3	47.4	49.5	48.2	99.9
Hector	5	46.3	48.2	50.0	46.5	50.2	48.2	99.9
Chinook	5	46.3	48.1	50.0	47.1	48.3	48.0	99.3
MT886610	2	--	--	--	46.4	49.2	47.8	99.1
H3860224	2	--	--	--	46.4	48.5	47.4	98.3
Targhee	3	--	--	49.7	45.0	49.2	48.0	98.0
H1851195	2	--	--	--	46.9	47.5	47.2	97.8
Harrington	5	45.7	47.0	49.2	46.2	47.5	47.1	97.6
Foster	1	--	--	--	--	48.9	48.9	97.2
Stander	2	--	--	--	43.0	50.2	46.6	96.6
Steptoe	5	42.8	41.5	46.7	43.9	44.8	43.9	91.0

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

Cultivar	# of years	1993	1994	1995	1996	1997	Ave	as % of Gallatin
MT886610	2	--	--	--	19	19	19.0	102.7
Hector	5	26	23	20	20	19	21.6	100.9
Gallatin	5	26	22	22	19	18	21.4	100.0
H1851195	2	--	--	--	19	18	18.5	100.0
H3860224	2	--	--	--	18	18	18.0	97.3
Stark	5	25	23	20	19	17	20.8	97.2
Bowman	5	24	22	19	19	17	20.2	94.4
Harrington	5	24	21	19	18	18	20.0	93.5
Lewis	5	24	22	17	18	19	20.0	93.5
Chinook	5	24	22	19	17	17	19.8	92.5
Logan	2	--	--	--	18	16	17.0	91.9
Targhee	3	--	--	18	18	18	18.0	91.5
Steptoe	5	25	21	17	17	15	19.0	88.8
Baronesse	5	23	20	17	17	18	19.0	88.8
Stander	2	--	--	--	16	11	13.5	73.0
Foster	1	--	--	--	--	12	12.0	66.7

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	# of years	1993	1994	1995	1996	1997	Ave	as % of Gallatin
H3860224	2	--	--	--	16.0	12.8	14.40	104.3
Baronesse	5	13.1	13.3	13.6	15.4	12.3	13.54	102.1
Targhee	3	--	--	13.3	15.4	12.4	13.70	102.0
Chinook	5	14.0	12.6	12.9	15.3	12.7	13.50	101.8
MT886610	2	--	--	--	15.6	12.4	14.00	101.4
Lewis	5	13.6	12.5	12.8	14.9	12.9	13.34	100.6
Harrington	5	13.5	12.5	13.0	15.1	12.5	13.32	100.5
H1851195	2	--	--	--	15.5	12.2	13.85	100.4
Stander	2	--	--	--	14.7	13.0	13.85	100.4
Gallatin	5	13.8	12.2	12.7	15.1	12.5	13.26	100.0
Hector	5	13.6	12.6	13.0	14.8	12.3	13.26	100.0
Foster	1	--	--	--	--	12.5	12.50	100.0
Bowman	5	13.8	12.0	12.6	12.9	12.5	12.76	96.2
Logan	2	--	--	--	13.8	12.6	13.20	95.7
Stark	5	13.4	11.0	12.4	13.1	12.4	12.46	94.0
Steptoe	5	12.9	11.4	12.4	12.7	11.7	12.22	92.2

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: 17 April 1997 Harvest date: 12 August 1997

Variety	Days to heading [1]	Height, inches	Protein content	Test wt, lb/bu	Yield bu/acre
Monida	61	27	11.7	31.8	93.5a
Celcia	62	28	11.6	29.5	92.7a
87AB5125	60	22	12.1	30.7	88.8
Whitestone	60	23	11.7	31.5	87.5
ND860416	60	28	12.3	32.5	85.1
90AB1322	59	21	12.4	29.7	83.6
Otana	59	27	12.7	32.8	83.5
86AB664	59	24	11.8	31.0	83.4
86AB4582	58	24	11.9	31.3	80.2
Powell	61	20	12.7	29.7	77.7
ABSP 9-2	58	23	11.8	31.5	74.9x
Prairie	57	24	12.9	30.2	74.2x
Rio Grande	57	20	13.2	30.8	72.5x
Ajay	59	19	13.6	31.0	70.4x
mean	59.3	23.6	12.3	31.0	82.0
CV (S/mean)	0.4	4.8	2.7	2.9	5.2
LSD 0.05	1.0	1.9	0.6	1.5	7.2

[1] Heading date is number of days from planting

Check variety is Otana with an average yield of 86.7 bu/a.
a indicates significantly greater than check variety, Otana, at a probability of <0.05
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	# of years	1993	1994	1995	1996	1997	Ave	as % of Otana
Cayuse	4	139.8	61.6	88.6	41.0	--	82.8	114.1
Celcia	1	--	--	--	--	92.7	92.7	111.0
Border	4	121.8	63.3	93.5	42.5	--	80.3	110.6
Monida	5	126.0	64.4	91.6	37.2	93.5	82.5	110.4
Appaloosa	4	128.6	60.2	87.0	34.5	--	77.6	106.9
Rio Grande	5	124.8	78.1	80.6	41.0	72.5	79.4	106.2
Otana	5	96.3	62.9	86.7	44.3	83.5	74.7	100.0
Newdak	4	99.0	71.5	86.2	33.6	--	72.6	100.0
Whitestone	4	--	66.1	91.3	31.5	87.5	69.1	99.6
Ajay	5	119.9	62.6	80.1	38.5	70.4	74.3	99.4
Powell	3	--	--	82.1	41.8	77.7	67.2	94.0
ND860416	2				29.8	85.1	57.4	89.9
Prairie	1	--	--	--	--	74.2	74.2	88.9

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

Cultivar	# of years	1993	1994	1995	1996	1997	Ave	as % of Otana
Otana	5	36.2	41.3	38.8	33.6	32.8	36.5	100.0
ND860416	2	--	--	--	31.3	32.5	31.9	96.1
Newdak	4	34.3	39.1	37.8	32.3	--	35.9	95.7
Whitestone	4	--	40.2	37.0	29.8	31.5	34.6	94.5
Monida	5	35.0	35.7	38.5	30.2	31.8	34.2	93.7
Ajay	5	33.3	36.3	38.3	31.3	31.0	34.0	93.2
Rio Grande	5	35.3	35.8	38.3	29.5	30.8	33.9	92.9
Prairie	1	--	--	--	--	30.2	30.2	92.1
Border	4	32.7	35.7	36.7	27.8	--	33.2	90.7
Celcia	1	--	--	--	--	29.5	29.5	89.9
Cayuse	4	34.0	36.0	37.2	27.0	--	33.6	89.5
Powell	3	--	--	37.0	27.1	29.7	31.3	89.2
Appaloosa	4	31.8	34.9	36.0	26.1	--	32.2	87.9

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.

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

Cultivar	# of years	1993	1994	1995	1996	1997	Ave	as % of Otana
Celcia	1	--	--	--	--	28	28.0	103.7
Otana	5	37	34	30	27	27	31.0	100.0
ND860416	2	--	--	--	24	28	26.0	96.3
Monida	5	35	31	26	20	27	27.8	89.7
Prairie	1	--	--	--	--	24	24.0	88.9
Newdak	4	34	28	26	22	--	27.5	85.9
Border	4	33	28	24	22	--	26.8	83.6
Whitestone	4	--	30	24	21	23	24.5	83.1
Cayuse	4	33	27	24	20	--	26.0	81.2
Appaloosa	4	32	27	24	21	--	26.0	81.2
Rio Grande	5	30	26	23	20	20	23.8	76.8
Powell	3	--	--	22	18	20	20.0	71.4
Ajay	5	26	23	18	14	19	20.0	64.5

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	# of years	1993	1994	1995	1996	1997	Ave	as % of Otana
Ajay	5	13.6	13.4	13.8	10.7	13.6	13.02	106.9
ND860416	2	--	--	--	9.6	12.3	10.95	103.2
Rio Grande	5	12.8	12.9	13.0	10.9	13.2	12.56	103.1
Newdak	4	13.7	13.0	12.6	10.2	--	12.38	102.7
Prairie	1	--	--	--	--	12.9	12.90	101.6
Powell	3	--	--	12.0	10.5	12.7	11.73	101.1
Border	4	12.9	13.2	12.3	9.9	--	12.08	100.2
Otana	5	13.2	12.9	12.8	9.3	12.7	12.18	100.0
Appaloosa	4	12.3	13.3	12.0	10.1	--	11.93	99.0
Cayuse	4	12.4	12.5	12.2	9.6	--	11.68	96.9
Whitestone	4	--	12.2	12.3	9.9	11.7	11.53	96.6
Monida	5	12.2	12.6	12.6	9.4	11.7	11.70	96.1
Celcia	1	--	--	--	--	11.6	11.60	91.3

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.