PROJECT TITLE: Off-station spring wheat yield trials - 2003

OBJECTIVE: To evaluate varieties of spring wheat under irrigated and dryland conditions at various sites in eastern Montana.

PROJECT LEADER: Joyce Eckhoff, MSU Eastern Agricultural Research Center, Sidney, MT

COOPERATORS:

County	Producers	CES Agents
Daniels, dryland	Bobbie Roos	Bobbie Roos
McCone, dryland	Victor Wagner	Ken Nelson
Roosevelt, dryland	Mark Swank	Gina Snyder
Sheridan, dryland	Max Aasheim	Terry Angvick
Valley, dryland	Bill Lauckner	Verlin Koenig
Valley, irrigated	Alisha (Zeller) & Cole Sibley	Verlin Koenig
Wibaux, dryland	David Maus	Dave Bertelsen

MATERIALS AND METHODS: Twenty spring wheat varieties were planted at six dryland and three irrigated sites. Plots were 20 feet long and three feet wide, with one foot between rows. Entire plots were harvested using a plot combine. Planting and harvest dates were

Location	Planted	Harvested
Scobey, Daniels County – dryland	Apr 29	Aug 20
Circle, McCone County – dryland	Apr 28	Aug 6
Poplar, Roosevelt County – dryland	Apr 29	Aug 15
Reserve, Sheridan County – dryland	Apr 30	Aug 12
Wibaux, Wibaux County – dryland	May 2	Aug 13
Nashua, Valley County – dryland	Apr 15	Jul 28
Nashua, Valley County – flood irrigated	Apr 17	Aug 14

RESULTS: Summaries of yields, test weights, heights and protein contents across all sites are shown in Tables 1-4. Outlook and Reeder yielded most across dryland sites (Table 1). Reeder yielded most at the irrigated site (Table 1).

McCone County: Performance and relative values of spring wheat varieties at **Circle** are shown in Tables 5-8. Outlook and Reeder had the greatest economic return.

Wibaux County (dryland): Performance and relative values of spring wheat varieties at **Wibaux** are shown in Tables 9-12. Outlook had the greatest economic return.

Roosevelt County (dryland): Performance and relative values of spring wheat varieties at **Poplar** are shown in Tables 13-16. Reeder had the greatest economic return.

Sheridan County (dryland): Performance and relative values of spring wheat varieties at **Reserve** are shown in Tables 17-20. Outlook, Laser and Hank had the greatest economic return.

Valley County (dryland): Performances of spring wheat varieties at **Nashua** are shown in Table 21-24. Outlook and Hank had the greatest economic return.

Daniels County (dryland): Performance and relative values of spring wheat varieties at **Scobey** are shown in Tables 25-28. Reeder had the greatest economic return.

Valley County (irrigated): Performance of spring wheat varieties under irrigation at **Nashua** are shown in Table 29. Reeder had the greatest economic return. This is the first year for this site so no relative values are available.

SUMMARY: The off-station yield trials are conducted at several sites in eastern Montana. These trials provide important information about performance of experimental lines and varieties from Montana State University, other state universities, and private companies. Regional spring wheat producers make decisions on varieties to grow based on data from these trials.

FUTURE PLANS: Off-station spring wheat yield trials will continue indefinitely. Expansion to other locations in future years is possible.

Table 1. Summary of spring wheat yields in bu/acre at seven off-station sites in eastern Montana, 2003. All dryland sites except McCone (Circle) are on fallow ground.

Variety	Circle, dryland recrop	Wibaux, dryland fallow	Poplar, dryland fallow	Reserve, dryland fallow	Nashua, dryland fallow	Scobey, dryland fallow	dryland average	Nashua, sprinkler irrigated
Outlook	**26.6**	**23.3**	56.5	**41.9**	**42.7**	**37.7**	38.1	74.7
Reeder	26.1	20.6	56.8	39.2	39.7	35.4	36.3	**80.0**
Hank	21.2	19.2	54.3	41.2	42.5	33.0	35.2	69.5
McNeal	22.9	20.0	**59.3**	37.9	39.4	31.6	35.2	71.1
Amidon	23.9	15.2	53.7	38.5	39.0	34.3	34.1	75.7
Scholar	25.5	15.2	53.0	39.0	37.6	30.4	33.4	74.2
Express	24.1	16.5	53.4	37.8	39.6	28.0	33.2	67.9
MT9918	21.6	20.3	51.3	36.4	36.7	30.5	32.8	74.6
Laser	18.6	18.7	52.5	**41.9**	40.5	22.1	32.4	57.6
Conan	23.7	17.3	49.9	32.7	39.0	29.9	32.1	65.3
Choteau	23.5	14.7	53.7	38.5	33.6	28.2	32.0	68.9
Ernest	22.3	14.3	48.6	36.9	37.5	31.8	31.9	74.7
Explorer*	19.1	17.5	48.6	37.6	37.1	29.0	31.5	60.2
McKenzie	21.2	13.8	51.7	37.3	39.3	25.0	31.4	69.8
Parshall	19.2	14.8	49.7	39.8	39.4	25.3	31.4	68.0
Ember	20.1	17.2	47.7	38.3	36.7	27.7	31.3	64.4
AC Barrie	19.5	17.3	48.0	35.3	38.2	24.7	30.5	73.4
Gunner	22.7	15.3	50.2	31.8	34.4	28.3	30.5	64.4
site average	22.3	17.3	52.2	37.9	38.5	29.6		69.7
p value	<0.001	0.002	<0.001	0.092	0.005	<0.001		<0.001
CV (S/Mean)	6.3	14.6	5.5	9.5	6.3	9.0		7.8
CV(SE/Mean)	3.6	8.4	3.2	5.5	3.7	5.2		4.5
LSD 0.05	2.3	4.2	4.8	6.0	4.0	4.4		9.0

*hard white wheat

Cooperators:

County	Producer	CES Agent
Sheridan (Reserve)	Max Aasheim	Terry Angvick
Wibaux (Wibaux)	David Maus	Dave Bertelsen
McCone (Circle)	Victor Wagner	Ken Nelson
Roosevelt (Poplar)	Mark Swank	Gina Snyder
Valley (Nashua)	Bill Lauckner	Verlin Koenig
Daniels (Scobey)	Bobbie Roos	Bobbie Roos
Valley Irrigated (Nashua)	Alisha (Zeller) & Cole Sibley	Verlin Koenig

Table 2. Summary of spring wheat test weights in lb/bu at seven off-station sites in eastern Montana, 2003. All dryland sites except McCone (Circle) are on fallow ground.

Variety	Circle, dryland recrop	Wibaux, dryland fallow	Poplar, dryland fallow	Reserve, dryland fallow	Nashua, dryland fallow	Scobey, dryland fallow	dryland average	Nashua, sprinkler irrigated
Ember	62.0	58.8	62.8	61.0	60.0	64.0	61.4	63.8
Scholar	61.2	58.1	62.8	60.3	60.2	62.7	60.9	63.0
Parshall	61.0	57.9	62.5	60.0	59.3	63.2	60.7	63.8
Ernest	60.4	56.8	62.2	60.8	60.0	62.8	60.5	62.7
Gunner	60.7	57.2	62.0	59.3	59.0	63.7	60.3	63.7
Reeder	60.3	56.3	62.2	60.7	58.2	63.0	60.1	63.0
Amidon	59.7	55.6	62.3	60.2	59.7	62.5	60.0	62.2
McKenzie	59.7	56.7	61.5	59.3	59.5	61.6	59.7	62.5
Conan	59.5	55.0	61.8	59.0	59.5	63.0	59.6	63.0
AC Barrie	57.5	56.9	61.8	59.8	59.5	62.0	59.6	62.7
Choteau	59.6	55.6	61.5	59.2	59.0	62.3	59.5	62.8
MT9918	58.7	55.7	60.5	58.5	57.7	61.7	58.8	61.7
Explorer*	58.4	54.2	59.3	57.8	57.5	61.7	58.2	61.0
Outlook	57.7	54.3	59.8	57.8	57.2	61.3	58.0	61.5
Express	59.0	52.2	60.3	57.3	56.5	62.3	57.9	60.9
Laser	57.8	54.2	59.7	58.2	57.0	60.2	57.9	60.0
McNeal	57.3	52.7	60.7	57.5	57.2	61.5	57.8	62.0
Hank	57.1	52.0	58.5	55.8	55.7	61.7	56.8	61.2
site average	59.3	55.6	61.2	59	58.5	62.3		62.3
p value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
CV (S/Mean)	1.1	2.3	1.1	1.0	1.2	0.8		0.7
CV(SE/Mean)	0.6	1.3	0.6	0.6	0.7	0.4		0.4
LSD 0.05	1.0	2.2	1.1	1.0	1.2	0.8		0.7

*hard white wheat

Cooperators:

County	Producer	CES Agent
Sheridan (Reserve)	Max Aasheim	Terry Angvick
Wibaux (Wibaux)	David Maus	Dave Bertelsen
McCone (Circle)	Victor Wagner	Ken Nelson
Roosevelt (Poplar)	Mark Swank	Gina Snyder
Valley (Nashua)	Bill Lauckner	Verlin Koenig
Daniels (Scobey)	Bobbie Roos	Bobbie Roos
Valley Irrigated (Nashua)	Alisha (Zeller) & Cole Sibley	Verlin Koenig

Table 3. Summary of spring wheat heights in inches at six dryland off-station sites in eastern Montana, 2003. All dryland sites except McCone (Circle) are on fallow ground.

Variety	Circle, dryland recrop	Wibaux, dryland fallow	Poplar, dryland fallow	Reserve, dryland fallow	Nashua, dryland fallow	Scobey, dryland fallow	dryland average	Nashua, sprinkler irrigated
Amidon	27.3	32.7	37.1	33.2	31.5	25.5	31.2	36.9
Ernest	27.3	32.2	37.5	30.8	31.1	25.9	30.8	36.3
AC Barrie	25.5	31.4	37.3	34.6	30.6	25.1	30.7	33.2
McKenzie	24.8	33.1	38.7	32.6	29.0	25.1	30.6	34.6
MT9918	25.5	31.0	36.5	33.2	29.8	26.1	30.3	32.3
Parshall	22.2	30.4	37.3	32.9	30.8	26.5	30.0	33.2
Scholar	27.0	30.2	36.5	30.4	28.6	26.4	29.8	34.0
Laser	23.1	31.5	34.9	34.1	29.9	24.3	29.6	31.1
Gunner	23.6	29.8	35.1	31.0	26.4	25.7	28.6	32.0
Ember	22.7	28.9	33.4	31.8	28.2	23.7	28.1	28.2
McNeal	24.1	29.0	32.3	28.4	29.5	24.7	28.0	30.1
Outlook	24.3	28.9	32.3	28.0	26.9	25.5	27.6	30.5
Reeder	22.8	27.8	33.4	29.5	26.8	23.9	27.4	30.8
Explorer*	21.9	26.0	31.2	29.5	27.2	23.5	26.6	29.1
Choteau	22.0	27.3	29.6	28.6	25.9	22.4	26.0	29.5
Hank	20.7	25.2	29.2	27.6	27.8	23.7	25.7	27.1
Conan	23.2	25.3	29.4	24.4	25.6	22.2	25.0	29.6
Express	21.2	24.4	27.3	24.1	25.1	22.5	24.1	26.4
site average	23.8	29.2	33.8	30.3	28.4	24.6		31.4
p value	<0.001	<0.001	<0.001	<0.001	<0.001	0.003		<0.001
CV (S/Mean)	4.0	4.6	2.7	5.3	6.4	5.6		5.9
CV(SE/Mean)	2.3	2.7	1.6	3.1	3.7	3.3		3.4
LSD 0.05	1.6	2.2	1.5	2.7	3.0	2.3		3.1

*hard white wheat

Cooperators:

County	Producer	CES Agent
Sheridan (Reserve)	Max Aasheim	Terry Angvick
Wibaux (Wibaux)	David Maus	Dave Bertelsen
McCone (Circle)	Victor Wagner	Ken Nelson
Roosevelt (Poplar)	Mark Swank	Gina Snyder
Valley (Nashua)	Bill Lauckner	Verlin Koenig
Daniels (Scobey)	Bobbie Roos	Bobbie Roos
Valley Irrigated (Nashua)	Alisha (Zeller) & Cole Sibley	Verlin Koenig

Table 4. Summary of spring wheat protein contents in percent at seven off-station sites in eastern Montana, 2003.

Variety	Circle, dryland recrop	Wibaux, dryland fallow	Poplar, dryland fallow	Reserve, dryland fallow	Nashua, dryland fallow	Scobey, dryland fallow	dryland average	Nashua, sprinkler irrigated
AC Barrie	16.19	20.49	15.00	18.00	17.10	14.62	16.90	14.97
Laser	15.93	19.92	14.63	17.50	16.94	15.54	16.74	14.90
Gunner	16.26	19.74	13.73	18.20	17.72	13.68	16.56	14.20
Reeder	15.73	18.98	14.33	17.20	17.98	14.69	16.49	14.51
Parshall	17.05	18.13	13.87	17.40	16.70	14.52	16.28	14.43
Conan	15.86	19.31	13.90	17.40	15.95	15.03	16.24	14.25
Explorer*	14.92	18.38	14.87	17.30	16.50	14.80	16.13	14.18
Ernest	15.45	18.87	13.23	17.10	16.11	14.15	15.82	14.71
Express	15.65	18.42	14.10	16.30	16.21	14.19	15.81	14.07
Scholar	15.93	18.67	13.10	17.10	16.09	13.42	15.72	14.37
McKenzie	15.29	18.40	12.93	16.80	16.20	13.05	15.45	13.96
Amidon	15.10	18.74	12.80	16.50	15.50	13.96	15.43	13.85
McNeal	14.92	19.27	12.53	16.80	15.45	13.56	15.42	12.63
MT9918	14.98	18.03	13.37	17.00	16.43	12.59	15.40	12.79
Choteau	15.09	17.51	13.30	16.80	15.72	13.87	15.38	13.29
Hank	14.25	18.01	13.27	16.90	16.84	12.99	15.38	13.23
Ember	15.33	18.05	12.97	16.70	15.96	12.83	15.31	13.27
Outlook	14.88	18.38	12.93	16.40	15.53	13.12	15.21	13.38
site average	15.49	18.74	13.60	17.1	16.39	13.9		13.94
p value	<0.001	0.089	0.048	<0.001	<0.001	<0.001		<0.001
CV (S/Mean)	3.0	5.4	6.8	2.0	4.1	4.3		4.2
CV(SE/Mean)	1.7	3.1	3.9	1.2	2.4	2.5		2.4
LSD 0.05	0.77	ns	1.53	0.6	1.11	0.99		0.98

*hard white wheat

Cooperators:

County	Producer	CES Agent
Sheridan (Reserve)	Max Aasheim	Terry Angvick
Wibaux (Wibaux)	David Maus	Dave Bertelsen
McCone (Circle)	Victor Wagner	Ken Nelson
Roosevelt (Poplar)	Mark Swank	Gina Snyder
Valley (Nashua)	Bill Lauckner	Verlin Koenig
Daniels (Scobey)	Bobbie Roos	Bobbie Roos
Valley Irrigated (Nashua)	Alisha (Zeller) & Cole Sibley	Verlin Koenig

Table 5. Performance of spring wheat grown under dryland continuous cropping conditions at Circle, MT. Planted: 28 Apr 2003 Harvested: 6 Aug 2003 Cooperator: Victor Wagner

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Outlook	24.3	14.88	57.7	26.6	18.43
Reeder	22.8	15.73	60.3	26.1	15.94
Scholar	27.0	15.93	61.2	25.5	12.95
Express	21.2	15.65	59.0	24.1	5.98
Amidon	27.3	15.10	59.7	23.9	4.98
Conan	23.2	15.86	59.5	23.7	3.99
Choteau	22.0	15.09	59.6	23.5	2.99
McNeal	24.1	14.92	57.3	22.9	0.00
Gunner	23.6	16.26	60.7	22.7	-0.99
Ernest	27.3	15.45	60.4	22.3	-2.99
MT9918	25.5	14.98	58.7	21.6	-6.47
McKenzie	24.8	15.29	59.7	21.2	-8.46
Hank	20.7	14.25	57.1	21.2	-11.64
Ember	22.7	15.33	62.0	20.1	-13.94
AC Barrie	25.5	16.19	57.5	19.5	-16.93
Parshall	22.2	17.05	61.0	19.2	-18.42
Laser	23.1	15.93	57.8	18.6	-21.41
Explorer*	21.9	14.92	58.4	19.1	**
average	23.8	15.49	59.3	22.3	
p value	<0.001	<0.001	<0.001	<0.001	
CV (S/Mean)	4.0	3.0	1.1	6.3	
CV(SE/Mean)	2.3	1.7	0.6	3.6	
LSD 0.05	1.6	0.77	1.0	2.3	

[1] Wheat prices summarized by G. Carlson, NARC, Havre, MT, from 10-year (1993-2002) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee
* hard white wheat, no average price for hard white wheat available at this time.

Table 6. Relative yielding abilities of spring wheat varieties as compared to McNeal when grown under dryland conditions in McCone County in cooperation with CES.
Cooperator: Victor Wagner

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Outlook	--	--	40.5	13.9	26.6	27.0	117.2
Reeder	45.6	27.0	38.5	16.4	26.1	30.7	111.2
Amidon	49.5	26.7	35.1	13.6	23.9	29.8	107.7
Scholar	40.6	28.4	33.0	17.9	25.5	29.1	105.3
McNeal	43.7	25.3	33.0	13.2	22.9	27.6	100.0
McKenzie	--	--	--	14.8	21.2	18.0	99.7
Express	--	--	30.2	14.6	24.1	23.0	99.7
Ernest	37.2	26.7	34.5	16.9	22.3	27.5	99.6
AC Barrie	--	--	--	15.4	19.5	17.5	96.7
Parshall	42.3	26.1	29.8	15.5	19.2	26.6	96.2
Conan	36.2	27.5	31.2	11.9	23.7	26.1	94.5
MT9918	--	--	--	--	21.6	21.6	94.3
Hank	--	--	--	12.2	21.2	16.7	92.5
Ember	--	--	--	12.9	20.1	16.5	91.4
Gunner	--	--	17.6	17.5	22.7	19.3	83.6
Choteau	--	--	25.2	9.1	23.5	19.3	83.6
Laser	--	--	--	--	18.6	18.6	81.2
Explorer	--	20.1	22.8	11.6	19.1	18.4	78.0

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 7. Relative test weights of spring wheat varieties as compared to McNeal when grown under dryland conditions in McCone County in cooperation with CES.
Cooperator: Victor Wagner

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Ember	--	--	--	62.1	62.0	62.1	107.0
Scholar	63.3	62.7	63.0	61.4	61.2	62.3	104.4
Gunner	--	--	63.8	60.5	60.7	61.7	104.2
Parshall	63.0	62.5	63.7	60.2	61.0	62.1	104.0
Ernest	62.3	62.2	63.0	61.8	60.4	61.9	103.8
Reeder	63.0	62.3	63.2	59.8	60.3	61.7	103.4
Conan	62.8	62.3	62.5	60.6	59.5	61.5	103.1
Choteau	--	--	62.8	59.7	59.6	60.7	102.6
Amidon	61.7	61.5	62.8	60.3	59.7	61.2	102.5
McKenzie	--	--	--	59.2	59.7	59.5	102.5
MT9918	--	--	--	--	58.7	58.7	102.4
Express	--	--	62.0	58.7	59.0	59.9	101.2
Laser	--	--	--	--	57.8	57.8	100.9
McNeal	61.0	60.0	61.5	58.7	57.3	59.7	100.0
Explorer	--	60.0	59.9	59.0	58.4	59.3	99.9
AC Barrie	--	--	--	58.3	57.5	57.9	99.8
Outlook	--	--	61.0	58.3	57.7	59.0	99.7
Hank	--	--	--	56.7	57.1	56.9	98.1

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 8. Relative protein contents of spring wheat varieties as compared to McNeal when grown under dryland conditions in McCone County in cooperation with CES.
Cooperator: Victor Wagner

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Gunner	--	--	14.5	12.4	16.3	14.4	123.8
Explorer	--	11.8	12.5	12.4	14.9	12.9	115.4
Reeder	15.3	11.2	10.8	12.7	15.7	13.1	115.1
Parshall	14.9	10.6	10.6	12.1	17.0	13.0	114.2
Conan	12.9	10.6	11.9	12.6	15.9	12.8	111.9
AC Barrie	--	--	--	12.9	16.2	14.6	111.5
Express	--	--	11.0	11.9	15.6	12.8	110.3
Ernest	13.8	11.0	10.5	11.7	15.4	12.5	109.3
Choteau	--	--	10.1	12.2	15.1	12.5	107.2
Laser	--	--	--	--	15.9	15.9	106.7
Scholar	13.8	9.4	9.9	11.8	15.9	12.2	106.5
Amidon	13.4	10.1	10.3	11.2	15.1	12.0	105.3
Outlook	--	--	10.1	11.5	14.9	12.2	104.6
McKenzie	--	--	--	11.9	15.3	13.6	104.2
Ember	--	--	--	11.5	15.3	13.4	102.7
MT9918	--	--	--	--	15.0	15.0	100.7
Hank	--	--	--	12.0	14.2	13.1	100.4
McNeal	12.4	9.8	8.8	11.2	14.9	11.4	100.0

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 9. Performance of spring wheat grown under dryland conditions at Wibaux, MT.
Planted: 2 May 2003 Harvested: 13 August 2003 Cooperator: David Maus

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Outlook	28.9	18.38	54.3	23.3	16.43
Reeder	27.8	18.98	56.3	20.6	2.99
MT9918	31.0	18.03	55.7	20.3	1.49
McNeal	29.0	19.27	52.7	20.0	0.00
Hank	25.2	18.01	52.0	19.2	-3.98
Laser	31.5	19.92	54.2	18.7	-6.47
AC Barrie	31.4	20.49	56.9	17.3	-13.45
Conan	25.3	19.31	55.0	17.3	-13.45
Ember	28.9	18.05	58.8	17.2	-13.94
Express	24.4	18.42	52.2	16.5	-17.43
Gunner	29.8	19.74	57.2	15.3	-23.41
Amidon	32.7	18.74	55.6	15.2	-23.90
Scholar	30.2	18.67	58.1	15.2	-23.90
Parshall	30.4	18.13	57.9	14.8	-25.90
Choteau	27.3	17.51	55.6	14.7	-26.39
Ernest	32.2	18.87	56.8	14.3	-28.39
McKenzie	33.1	18.40	56.7	13.8	-30.88
Explorer*	26.0	18.38	54.2	17.5	**
average	29.2	18.74	55.6	17.3	
p value	<0.001	0.089	<0.001	0.002	
CV (S/Mean)	4.6	5.4	2.3	14.6	
CV(SE/Mean)	2.7	3.1	1.3	8.4	
LSD 0.05	2.2	ns	2.2	4.2	

[1] Wheat prices summarized by G. Carlson, NARC, Havre, MT, from 10-year (1993-2002) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee
* hard white wheat, no average price for hard white wheat available at this time.

Table 10. Relative yielding abilities of spring wheat varieties as compared to McNeal when grown under dryland conditions in Wibaux County in cooperation with CES.
Cooperator: David Maus

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Hank	--	--	--	31.4	19.2	25.3	111.5
Reeder	37.6	45.1	49.4	30.8	20.6	36.7	108.9
Outlook	--	--	50.2	27.0	23.3	33.5	107.1
Parshall	40.3	42.4	43.0	39.6	14.8	36.0	106.9
Amidon	38.6	46.7	45.2	26.7	15.2	34.5	102.3
Scholar	34.8	46.9	42.0	32.3	15.2	34.2	101.6
MT9918	--	--	--	--	20.3	20.3	101.5
Ember	--	--	--	28.8	17.2	23.0	101.3
McNeal	29.5	45.2	48.4	25.4	20.0	33.7	100.0
Ac Barrie	--	--	--	26.8	17.3	22.1	97.1
McKenzie	--	--	--	29.8	13.8	21.8	96.0
Ernest	35.2	40.1	43.6	26.9	14.3	32.0	95.0
Laser	--	--	--	--	18.7	18.7	93.5
Express	--	--	41.2	24.3	16.5	27.3	87.4
Conan	30.8	33.6	36.7	25.9	17.3	28.9	85.6
Gunner	--	--	40.1	23.9	15.3	26.4	84.5
Explorer	--	36.5	35.7	26.0	17.5	28.9	83.2
Choteau	--	--	38.3	25.0	14.7	26.0	83.2

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 11. Relative test weights of spring wheat varieties as compared to McNeal when grown under dryland conditions in Wibaux County in cooperation with CES.
Cooperator: David Maus

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Ember	--	--	--	59.6	58.8	59.2	107.4
MT9918	--	--	--	--	55.7	55.7	105.7
Gunner	--	--	63.0	59.0	57.2	59.7	105.3
Parshall	61.1	63.5	61.2	59.8	57.9	60.7	104.4
Scholar	59.7	62.3	61.7	60.2	58.1	60.4	103.9
Ac Barrie	--	--	--	57.2	56.9	57.1	103.5
McKenzie	--	--	--	57.3	56.7	57.0	103.4
Conan	59.9	63.0	61.3	59.9	55.0	59.8	102.9
Laser	--	--	--	--	54.2	54.2	102.8
Ernest	58.5	63.0	60.8	58.8	56.8	59.6	102.5
Reeder	59.7	63.3	60.7	57.5	56.3	59.5	102.4
Choteau	--	--	60.5	57.6	55.6	57.9	102.1
Amidon	58.0	62.0	61.2	57.8	55.6	58.9	101.4
Explorer	--	62.7	58.2	58.2	54.2	58.3	100.5
Outlook	--	--	59.2	57.0	54.3	56.8	100.2
McNeal	58.4	62.0	60.0	57.5	52.7	58.1	100.0
Express	--	--	59.0	57.9	52.2	56.4	99.4
Hank	--	--	--	57.0	52.0	54.5	98.9

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 12. Relative protein contents of spring wheat varieties as compared to McNeal when grown under dryland conditions in Wibaux County in cooperation with CES.
Cooperator: David Maus

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Reeder	13.0	18.1	16.3	17.1	19.0	16.7	107.6
Gunner	--	--	16.5	17.1	19.7	17.8	106.6
Ernest	13.7	17.3	16.1	16.4	18.9	16.5	106.2
Conan	13.4	16.2	16.0	16.5	19.3	16.3	104.9
Ac Barrie	--	--	--	16.6	20.5	18.6	104.2
Parshall	12.7	18.6	15.5	15.5	18.1	16.1	103.6
Laser	--	--	--	--	19.9	19.9	103.1
Scholar	13.1	16.6	15.0	16.2	18.7	15.9	102.6
Amidon	13.6	17.0	13.9	15.8	18.7	15.8	101.8
Explorer	--	16.9	15.4	15.9	18.4	16.7	101.2
McNeal	11.8	15.8	14.4	16.3	19.3	15.5	100.0
Express	--	--	15.3	16.2	18.4	16.6	99.8
McKenzie	--	--	--	16.0	18.4	17.2	96.6
Choteau	--	--	14.8	15.6	17.5	16.0	95.8
Outlook	--	--	13.6	15.8	18.4	15.9	95.6
Ember	--	--	--	15.9	18.0	17.0	95.2
Hank	--	--	--	15.8	18.0	16.9	94.9
MT9918	--	--	--	--	18.0	18.0	93.3

NOTE: Average proteins 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 13. Performance of spring wheat grown under dryland conditions at Poplar, MT.
Planted: 29 Apr 2003 Harvested: 15 Aug 2003 Cooperator: Mark Swank

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Reeder	33.4	14.33	62.2	56.8	17.57
McNeal	32.3	12.53	60.7	59.3	0.00
Laser	34.9	14.63	59.7	52.5	-0.57
Express	27.3	14.10	60.3	53.4	-1.52
Outlook	32.3	12.93	59.8	56.5	-3.47
Hank	29.2	13.27	58.5	54.3	-11.33
Choteau	29.6	13.30	61.5	53.7	-14.05
AC Barrie	37.3	15.00	61.8	48.0	-17.73
Conan	29.4	13.90	61.8	49.9	-18.25
Parshall	37.3	13.87	62.5	49.7	-19.20
MT9918	36.5	13.37	60.5	51.3	-20.79
Amidon	37.1	12.80	62.3	53.7	-21.03
Gunner	35.1	13.73	62.0	50.2	-21.33
Scholar	36.5	13.10	62.8	53.0	-21.98
McKenzie	38.7	12.93	61.5	51.7	-27.74
Ernest	37.5	13.23	62.2	48.6	-37.10
Ember	33.4	12.97	62.8	47.7	-45.46
Explorer*	31.2	14.87	59.3	48.6	**
average	33.8	13.60	61.2	52.2	
p value	<0.001	0.048	<0.001	<0.001	
CV (S/Mean)	2.7	6.8	1.1	5.52	
CV(SE/Mean)	1.6	3.9	0.6	3.2	
LSD 0.05	1.5	1.53	1.1	4.8	

[1] Wheat prices summarized by G. Carlson, NARC, Havre, MT, from 10-year (1993-2002) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee
* hard white wheat, no average price for hard white wheat available at this time.

Table 14. Relative yields of spring wheat varieties as compared to McNeal when grown under dryland conditions in Roosevelt County in cooperation with CES.
Cooperator: Mark Swank

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Reeder	49.8	66.4	59.9	46.4	56.8	55.9	107.4
Outlook	--	--	64.0	41.7	56.5	54.1	104.7
McNeal	46.7	58.4	58.5	37.1	59.3	52.0	100.0
Parshall	47.4	61.3	58.8	40.5	49.7	51.5	99.1
Scholar	45.3	58.9	61.6	37.8	53.0	51.3	98.7
Express	--	--	57.0	41.9	53.4	50.8	98.3
Amidon	43.8	62.4	57.8	34.0	53.7	50.3	96.8
Hank	--	--	--	38.5	54.3	46.4	96.3
Choteau	--	--	54.5	40.7	53.7	49.6	96.1
McKenzie	--	--	--	40.6	51.7	46.2	95.7
Ernest	41.6	62.9	56.3	38.0	48.6	49.5	95.2
Gunner	--	--	57.9	38.2	50.2	48.8	94.4
Ember	--	--	--	41.1	47.7	44.4	92.1
AC Barrie	--	--	--	40.7	48.0	44.4	92.0
Laser	--	--	--	--	52.5	52.5	88.5
MT9918	--	--	--	--	51.3	51.3	86.5
Explorer	--	52.8	43.2	38.6	48.6	45.8	85.9
Conan	35.4	51.7	48.9	34.9	49.9	44.2	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 15. Relative test weights of spring wheat varieties as compared to McNeal when grown under dryland conditions in Roosevelt County in cooperation with CES.
Cooperator: Mark Swank

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Ember	--	--	--	62.0	62.8	62.4	108.6
McKenzie	--	--	--	60.5	61.5	61.0	106.2
AC Barrie	--	--	--	60.0	61.8	60.9	106.0
Gunner	--	--	64.3	61.5	62.0	62.6	105.7
Parshall	61.0	62.8	64.7	62.3	62.5	62.7	105.0
Reeder	61.0	63.0	63.7	60.5	62.2	62.1	104.0
Ernest	60.7	63.0	64.0	60.3	62.2	62.0	103.9
Scholar	60.5	61.8	63.5	60.0	62.8	61.7	103.4
Choteau	--	--	63.2	58.5	61.5	61.1	103.1
Amidon	60.0	62.2	63.0	59.2	62.3	61.3	102.7
Express	--	--	62.7	59.2	60.3	60.7	102.5
Conan	60.0	61.3	62.5	59.8	61.8	61.1	102.3
Outlook	--	--	61.8	58.2	59.8	59.9	101.2
Hank	--	--	--	57.2	58.5	57.9	100.7
McNeal	59.3	61.5	62.8	54.2	60.7	59.7	100.0
MT9918	--	--	--	--	60.5	60.5	99.7
Explorer	--	60.5	60.2	57.8	59.3	59.5	99.4
Laser	--	--	--	--	59.7	59.7	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 16. Relative protein contents of spring wheat varieties as compared to McNeal when grown under dryland conditions in Roosevelt County in cooperation with CES.
Cooperator: Mark Swank

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Laser	--	--	--	--	14.6	14.6	116.8
Reeder	15.0	16.1	15.4	15.6	14.3	15.3	116.3
Parshall	15.6	15.8	15.4	15.5	13.9	15.2	116.0
AC Barrie	--	--	--	15.5	15.0	15.3	115.5
Explorer	--	14.5	14.8	14.5	14.9	14.7	112.5
Gunner	--	--	14.6	15.2	13.7	14.5	110.7
Ernest	14.8	14.3	14.5	14.9	13.2	14.3	109.1
Conan	14.7	14.9	14.0	14.2	13.9	14.3	109.1
Scholar	14.8	14.2	14.6	14.7	13.1	14.3	108.7
Express	--	--	14.2	14.2	14.1	14.2	108.1
MT9918	--	--	--	--	13.4	13.4	107.2
Hank	--	--	--	14.6	13.3	14.0	105.7
McKenzie	--	--	--	14.7	12.9	13.8	104.5
Ember	--	--	--	14.5	13.0	13.8	104.2
Choteau	--	--	12.9	14.5	13.3	13.6	103.6
Amidon	14.1	13.5	13.6	13.9	12.8	13.6	103.3
Outlook	--	--	13.4	13.6	12.9	13.3	101.5
McNeal	13.5	12.9	12.9	13.9	12.5	13.1	100.0

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 17. Performance of spring wheat grown under dryland conditions at Reserve, MT.
Planted: 30 April 2003 Harvested: 12 August 2003 Cooperator: Max Aasheim

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Outlook	28.0	16.4	57.8	41.9	19.92
Laser	34.1	17.5	58.2	41.9	19.92
Hank	27.6	16.9	55.8	41.2	16.44
Parshall	32.9	17.4	60.0	39.8	9.46
Reeder	29.5	17.2	60.7	39.2	6.48
Scholar	30.4	17.1	60.3	39.0	5.48
Amidon	33.2	16.5	60.2	38.5	2.99
Choteau	28.6	16.8	59.2	38.5	2.99
Ember	31.8	16.7	61.0	38.3	1.99
McNeal	28.4	16.8	57.5	37.9	0.00
Express	24.1	16.3	57.3	37.8	-0.50
McKenzie	32.6	16.8	59.3	37.3	-2.99
Ernest	30.8	17.1	60.8	36.9	-4.98
MT9918	33.2	17.0	58.5	36.4	-7.47
AC Barrie	34.6	18.0	59.8	35.3	-12.95
Conan	24.4	17.4	59.0	32.7	-25.89
Gunner	31.0	18.2	59.3	31.8	-30.38
Explorer*	29.5	17.3	57.8	37.6	**
average	30.3	17.1	59.0	37.9	
p value	<0.001	<0.001	<0.001	0.092	
CV (S/Mean)	5.3	2.0	1.0	9.5	
CV(SE/Mean)	3.1	1.2	0.6	5.5	
$LSD_{0.05}$	2.7	0.6	1.0	6.0	

[1] Wheat prices summarized by G. Carlson, NARC, Havre, MT, from 10-year (1993-2002) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee
* hard white wheat, no average price for hard white wheat available at this time.

Table 18. Relative yielding abilities of spring wheat varieties as compared to McNeal when grown under dryland conditions in Sheridan County in cooperation with CES.
Cooperator: Max Aasheim

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Reeder	49.8	38.2	45.4	38.3	39.2	42.2	114.2
Outlook	--	--	44.2	39.6	41.9	41.9	113.7
Hank	--	--	--	33.4	41.2	37.3	112.9
Ember	--	--	--	36.2	38.3	37.3	112.7
Laser	--	--	--	--	41.9	41.9	110.6
Parshall	42.3	38.3	45.1	34.8	39.8	40.1	108.4
McKenzie	--	--	--	33.4	37.3	35.4	107.0
Choteau	--	--	41.8	35.4	38.5	38.6	104.6
Amidon	37.5	39.6	45.6	29.1	38.5	38.1	103.0
AC Barrie	--	--	--	32.5	35.3	33.9	102.6
McNeal	37.3	36.8	44.5	28.2	37.9	36.9	100.0
Express	--	--	41.0	28.6	37.8	35.8	97.1
Scholar	36.2	32.8	42.7	28.2	39.0	35.8	96.9
MT9918	--	--	--	--	36.4	36.4	96.0
Ernest	37.4	35.0	38.6	28.4	36.9	35.3	95.5
Gunner	--	34.4	39.3	33.6	31.8	34.8	94.4
Conan	32.1	28.4	33.7	26.5	32.7	30.7	83.1
Explorer	--	26.6	32.5	23.1	37.6	30.0	81.3

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 19. Relative test weights of spring wheat varieties as compared to McNeal when grown under dryland conditions in Sheridan County in cooperation with CES.
Cooperator: Max Aasheim

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Ember	--	--	--	62.3	61.0	61.7	106.5
Parshall	63.7	62.5	64.7	60.8	60.0	62.3	103.7
Gunner	--	62.0	64.5	60.5	59.3	61.6	102.8
Reeder	63.2	61.7	63.7	59.7	60.7	61.8	102.8
Ernest	62.3	61.0	63.7	59.2	60.8	61.4	102.2
Scholar	62.7	61.2	63.5	59.2	60.3	61.4	102.1
AC Barrie	--	--	--	58.2	59.8	59.0	101.9
Conan	62.8	61.0	62.8	60.2	59.0	61.2	101.8
MT9918	--	--	--	--	58.5	58.5	101.7
Amidon	62.0	60.8	63.0	59.2	60.2	61.0	101.6
McKenzie	--	--	--	58.3	59.3	58.8	101.6
Choteau	--	--	63.2	58.8	59.2	60.4	101.5
Laser	--	--	--	--	58.2	58.2	101.2
McNeal	61.0	61.0	62.7	58.3	57.5	60.1	100.0
Express	--	--	62.7	58.3	57.3	59.4	99.9
Outlook	--	--	61.7	58.5	57.8	59.3	99.7
Hank	--	--	--	56.8	55.8	56.3	97.2
Explorer	--	56.3	60.2	57.2	57.8	57.9	96.7

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 20. Relative protein contents of spring wheat varieties as compared to McNeal when grown under dryland conditions in Sheridan County in cooperation with CES.
Cooperator: Max Aasheim

Cultivar	1999	2000	2001	2002	2003	Ave	as % of McNeal
Parshall	15.0	13.1	15.4	15.4	17.4	15.3	113.0
Gunner	--	13.2	16.0	14.6	18.2	15.5	110.9
Reeder	13.8	13.6	15.8	14.1	17.2	14.9	110.4
AC Barrie	--	--	--	14.9	18.0	16.5	110.0
Conan	13.6	12.5	15.2	14.5	17.4	14.6	108.4
Ernest	13.6	12.1	15.8	14.2	17.1	14.6	107.9
Scholar	13.0	11.9	15.6	14.5	17.1	14.4	106.8
Explorer	--	12.6	15.4	14.2	17.3	14.9	106.4
Amidon	13.1	11.9	15.4	13.7	16.5	14.1	104.6
Laser	--	--	--	--	17.5	17.5	104.2
Hank	--	--	--	14.1	16.9	15.5	103.7
Express	--	--	15.6	14.2	16.3	15.4	103.1
McKenzie	--	--	--	14.0	16.8	15.4	103.0
MT9918	--	--	--	--	17.0	17.0	101.2
Choteau	--	--	14.4	13.9	16.8	15.0	100.9
McNeal	11.6	11.2	14.8	13.1	16.8	13.5	100.0
Outlook	--	--	14.8	13.2	16.4	14.8	99.3
Ember	--	--	--	12.8	16.7	14.8	98.7

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 21. Performance of spring wheat grown under dryland conditions at Nashua, MT.
Planted: 15 April 2003 Harvested: 28 July 2003 Cooperator: Bill Lauckner

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Outlook	26.9	15.53	57.2	42.7	16.44
Hank	27.8	16.84	55.7	42.5	15.44
Laser	29.9	16.94	57.0	40.5	5.48
Reeder	26.8	17.98	58.2	39.7	1.50
Express	25.1	16.21	56.5	39.6	1.00
McNeal	29.5	15.45	57.2	39.4	0.00
Parshall	30.8	16.70	59.3	39.4	0.00
McKenzie	29.0	16.20	59.5	39.3	-0.50
Amidon	31.5	15.50	59.7	39.0	-1.99
Conan	25.6	15.95	59.5	39.0	-1.99
AC Barrie	30.6	17.10	59.5	38.2	-5.97
Scholar	28.6	16.09	60.2	37.6	-8.96
Ernest	31.1	16.11	60.0	37.5	-9.46
MT9918	29.8	16.43	57.7	36.7	-13.44
Ember	28.2	15.96	60.0	36.7	-13.44
Gunner	26.4	17.72	59.0	34.4	-24.90
Choteau	25.9	15.72	59.0	33.6	-28.88
Explorer	27.2	16.50	57.5	37.1	**
average	28.4	16.39	58.5	38.5	
p value	<0.001	<0.001	<0.001	0.005	
CV (S/Mean)	6.4	4.1	1.2	6.3	
CV(SE/Mean)	3.7	2.4	0.7	3.7	
LSD 0.05	3.0	1.11	1.2	4.0	

[1] Wheat prices summarized by G. Carlson, NARC, Havre, MT, from 10-year (1993-2002) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee
* hard white wheat, no average price for hard white wheat available at this time.

Table 22. Relative yielding abilities of spring wheat varieties as compared to McNeal when grown under dryland conditions in Valley County in cooperation with CES.
Cooperator: Bill Lauckner

Cultivar	1998	2000	2001	2002	2003	Ave	as % of McNeal
Hank	--	--	--	47.7	42.5	45.1	106.1
Laser	--	--	--	--	40.5	40.5	102.8
Reeder	49.5	61.9	70.0	51.6	39.7	54.5	101.1
Gunner	--	--	73.4	40.6	34.4	49.5	100.1
McNeal	55.8	65.7	63.3	45.6	39.4	54.0	100.0
Outlook	--	--	56.9	48.7	42.7	49.4	100.0
McKenzie	--	--	--	45.3	39.3	42.3	99.5
Express	--	--	62.7	42.7	39.6	48.3	97.8
Ember	--	--	60.1	47.2	36.7	48.0	97.1
Parshall	44.7	59.5	70.0	46.5	39.4	52.0	96.4
AC Barrie	--	--	--	43.7	38.2	41.0	96.4
Scholar	52.1	61.3	62.2	46.7	37.6	52.0	96.3
Choteau	--	--	64.1	42.3	33.6	46.7	94.4
Conan	--	60.0	57.8	44.8	39.0	50.4	94.2
MT9918	--	--	--	--	36.7	36.7	93.1
Amidon	48.4	64.8	56.1	43.0	39.0	50.3	93.1
Ernest	39.4	59.8	62.4	43.1	37.5	48.4	89.8
Explorer	--	53.0	42.1	46.5	37.1	44.7	83.5

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. Site hailed out in 1999.

Table 23. Relative test weights of spring wheat varieties as compared to McNeal when grown under dryland conditions in Valley County in cooperation with CES.
Cooperator: Bill Lauckner

Cultivar	1998	2000	2001	2002	2003	Ave	as % of McNeal
Ember	--	--	62.8	61.0	60.0	61.3	103.0
Parshall	64.2	63.7	63.8	61.0	59.3	62.4	102.8
Gunner	--	--	63.5	60.8	59.0	61.1	102.7
AC Barrie	--	--	--	60.3	59.5	59.9	102.5
Scholar	63.3	63.0	63.2	60.5	60.2	62.0	102.2
Ernest	64.0	63.0	62.2	60.0	60.0	61.8	101.9
Reeder	64.3	63.5	62.7	60.0	58.2	61.7	101.7
McKenzie	--	--	--	59.0	59.5	59.3	101.4
Choteau	--	--	62.8	59.0	59.0	60.3	101.3
Amidon	63.0	62.7	61.8	59.5	59.7	61.3	101.1
Conan	--	63.0	61.7	59.2	59.5	60.9	101.0
MT9918	--	--	--	--	57.7	57.7	100.9
McNeal	62.5	62.5	61.5	59.7	57.2	60.7	100.0
Laser	--	--	--	--	57.0	57.0	99.7
Outlook	--	--	61.0	58.8	57.2	59.0	99.2
Express	--	--	59.8	59.3	56.5	58.5	98.4
Explorer	--	--	59.7	56.3	57.5	57.8	97.3
Hank	--	--	--	57.0	55.7	56.4	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. Site hailed out in 1999.

Table 24. Relative protein contents of spring wheat varieties as compared to McNeal when grown under dryland conditions in Valley County in cooperation with CES.
Cooperator: Bill Lauckner

Cultivar	1998	2000	2001	2002	2003	Ave	as % of McNeal
Gunner	--	--	15.0	13.6	17.7	15.4	118.7
AC Barrie	--	--	--	13.2	17.1	15.2	114.8
Reeder	13.5	11.3	13.8	14.1	18.0	14.1	113.8
Parshall	15.4	10.6	14.1	12.9	16.7	13.9	112.2
Hank	--	--	--	12.8	16.8	14.8	112.1
Explorer	--	11.0	13.0	14.6	16.5	13.8	111.3
Ernest	15.7	10.5	14.2	12.5	16.1	13.8	111.1
McKenzie	--	--	--	12.9	16.2	14.6	110.2
Laser	--	--	--	--	16.9	16.9	109.7
Ember	--	--	14.0	12.6	16.0	14.2	109.2
Express	--	--	12.9	13.2	16.2	14.1	108.5
Scholar	13.8	10.7	13.4	12.6	16.1	13.3	107.2
MT9918	--	--	--	--	16.4	16.4	106.5
Conan	--	10.0	12.6	13.9	16.0	13.1	106.1
Amidon	14.7	10.1	13.0	11.8	15.5	13.0	104.8
Choteau	--	--	11.9	12.4	15.7	13.3	102.6
Outlook	--	--	11.6	12.3	15.5	13.1	101.0
McNeal	12.6	10.5	12.6	11.0	15.4	12.4	100.0

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. Site hailed out in 1999.

Table 25. Performance of spring wheat grown under dryland conditions at Scobey, MT.
Planted: 29 April 2003 Harvested: 20 August 2003 Cooperator: Bobbie Roos

Variety	Height, inches	Grain protein	Test Weight	Yield Bu/acre	$/acre[1] +/- McNeal
Reeder	23.9	14.69	63.0	35.4	29.16
Outlook	25.5	13.12	61.3	37.7	21.65
Amidon	25.5	13.96	62.5	34.3	18.59
Ernest	25.9	14.15	62.8	31.8	8.23
Conan	22.2	15.03	63.0	29.9	3.54
Hank	23.7	12.99	61.7	33.0	0.83
McNeal	24.7	13.56	61.5	31.6	0.00
Scholar	26.4	13.42	62.7	30.4	-5.52
Express	22.5	14.19	62.3	28.0	-10.12
Choteau	22.4	13.87	62.3	28.2	-10.56
Gunner	25.7	13.68	63.7	28.3	-12.63
MT9918	26.1	12.59	61.7	30.5	-13.29
Parshall	26.5	14.52	63.2	25.3	-21.90
Ember	23.7	12.83	64.0	27.7	-23.76
AC Barrie	25.1	14.62	62.0	24.7	-24.82
McKenzie	25.1	13.05	61.6	25.0	-34.61
Laser	24.3	15.54	60.2	22.1	-35.30
Explorer*	23.5	14.80	61.7	29.0	**
average	24.6	13.92	62.3	29.6	
p value	0.003	<0.001	<0.001	<0.001	
CV (S/Mean)	5.6	4.3	0.8	9.0	
CV(SE/Mean)	3.3	2.5	0.4	5.2	
LSD 0.05	2.3	0.99	0.8	4.4	

[1] Wheat prices summarized by G. Carlson, NARC, Havre, MT, from 10-year (1993-2002) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee
* hard white wheat, no average price for hard white wheat available at this time.

Table 26. Relative yields of spring wheat varieties as compared to McNeal when grown under dryland conditions in Daniels County in cooperation with CES. Cooperator: Bobbie Roos

Variety	1999	2001	2002	2003	average	As % of McNeal
Outlook	--	26.9	32.0	37.7	32.2	107.7
Amidon	59.5	29.1	25.4	34.3	37.1	106.1
Hank	--	--	30.2	33.0	31.6	103.6
Scholar	53.9	28.2	30.6	30.4	35.8	102.4
Ernest	53.3	29.2	29.1	31.8	35.8	102.3
Reeder	51.3	25.0	31.3	35.4	35.8	102.3
AC Barrie	--	--	29.7	24.7	27.2	100.6
McNeal	50.1	28.7	29.4	31.6	35.0	100.0
MT9918	--	--	--	30.5	30.5	96.5
Parshall	48.3	23.1	28.8	25.3	31.4	89.8
Conan	50.7	23.6	20.8	29.9	31.2	89.4
Gunner	--	17.5	33.7	28.3	26.5	88.6
Express	--	21.3	29.7	28.0	26.3	88.1
Explorer	--	21.9	27.0	29.0	26.0	86.8
Ember	--	--	25.1	27.7	26.4	86.6
McKenzie	--	--	26.6	25.0	25.8	84.6
Choteau	--	20.8	23.1	28.2	24.0	80.4
Laser	--	--	--	22.1	22.1	69.9

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

Table 27. Relative test weights of spring wheat varieties as compared to McNeal when grown under dryland conditions in Daniels County in cooperation with CES. Cooperator: Bobbie Roos

Variety	1999	2001	2002	2003	average	As % of McNeal
Ember	--	--	63.8	64.0	63.9	105.4
Gunner	--	63.4	62.8	63.7	63.3	103.9
Parshall	62.9	64.0	63.0	63.2	63.3	103.6
Reeder	62.9	63.4	61.3	63.0	62.6	102.5
Ernest	62.3	62.9	61.7	62.8	62.4	102.2
Choteau	--	63.4	60.8	62.3	62.2	102.1
Conan	62.2	63.1	60.2	63.0	62.1	101.7
Express	--	62.8	60.3	62.3	61.8	101.5
Scholar	62.7	62.6	59.8	62.7	62.0	101.4
AC Barrie	--	--	60.7	62.0	61.4	101.2
McKenzie	--	--	61.2	61.6	61.4	101.1
Hank	--	--	60.8	61.7	61.2	101.0
Amidon	62.0	62.4	58.8	62.5	61.4	100.5
MT9918	--	--	--	61.7	61.7	100.3
Explorer	--	61.7	59.7	61.7	61.0	100.2
Outlook	--	61.8	59.7	61.3	60.9	100.1
McNeal	61.7	61.4	59.8	61.5	61.1	100.0
Laser	--	--	--	60.2	60.2	97.9

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

Table 28. Relative protein contents of spring wheat varieties as compared to McNeal when grown under dryland conditions in Daniels County in cooperation with CES. Cooperator: Bobbie Roos

Variety	1999	2001	2002	2003	average	As % of McNeal
Conan	11.0	11.0	13.4	15.0	12.6	115.3
Laser	--	--	--	15.5	15.5	114.0
Reeder	10.4	11.7	12.4	14.7	12.3	112.6
AC Barrie	--	--	12.5	14.6	13.6	111.5
Parshall	11.1	10.5	12.1	14.5	12.0	110.3
Explorer	--	10.5	12.2	14.8	12.5	110.0
Express	--	10.1	12.4	14.2	12.2	107.6
Amidon	10.0	10.4	12.3	14.0	11.7	106.9
Scholar	10.2	10.3	11.6	13.4	11.4	104.1
Ernest	10.0	10.3	11.9	13.0	11.3	103.4
Choteau	--	8.8	12.3	13.9	11.7	102.6
McKenzie	--	--	11.8	13.0	12.4	102.1
Outlook	--	9.7	11.4	13.1	11.4	100.3
McNeal	9.6	9.8	10.7	13.6	10.9	100.0
Gunner	--	9.2	11.1	13.7	11.3	99.7
Hank	--	--	11.2	13.0	12.1	99.6
Ember	--	--	10.6	12.8	11.7	96.3
MT9918	--	--	--	12.6	12.6	92.6

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

Table 29. Performance of spring wheat grown under irrigated conditions at Nashua, MT.
Planted: 17 April 2003 Harvested: 14 August 2003 Cooperator: Alisha (Zeller) & Cole Sibley

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Reeder	30.8	14.51	63.0	80.0	78.27
Ernest	36.3	14.71	62.7	74.7	56.14
AC Barrie	33.2	14.97	62.7	73.4	53.40
Scholar	34.0	14.37	63.0	74.2	49.97
Amidon	36.9	13.85	62.2	75.7	42.90
Outlook	30.5	13.38	61.5	74.7	31.49
McKenzie	34.6	13.96	62.5	69.8	21.51
Parshall	33.2	14.43	63.8	68.0	19.71
MT9918	32.3	12.79	61.7	74.6	15.36
Express	26.4	14.07	60.9	67.9	12.43
Conan	29.6	14.25	63.0	65.3	3.27
Hank	27.1	13.23	61.2	69.5	2.01
McNeal	30.1	12.63	62.0	71.1	0.00
Choteau	29.5	13.29	62.8	68.9	-0.70
Gunner	32.0	14.20	63.7	64.4	-1.08
Ember	28.2	13.27	63.8	64.4	-21.04
Laser	31.1	14.90	60.0	57.6	-25.28
Explorer*	29.1	14.18	61.0	60.2	**
average	31.4	13.94	62.3	69.7	
p value	<0.001	<0.001	<0.001	<0.001	
CV (S/Mean)	5.9	4.2	0.7	7.8	
CV(SE/Mean)	3.4	2.4	0.4	4.5	
LSD 0.05	3.1	0.98	0.7	9.0	

[1] Wheat prices summarized by G. Carlson, NARC, Havre, MT, from 10-year (1993-2002) average daily market values for PNW, supplied by the Montana Wheat and Barley Committee
* hard white wheat, no average price for hard white wheat available at this time.