PROJECT TITLE: Off-station spring wheat yield trials - 1999

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	Nels Boe
Roosevelt, dryland	Mark Swank	Chet Hill
Sheridan, dryland	Max Aasheim	Terry Angvick
Sheridan, irrigated	Steve Brekke	Terry Angvick
Valley, dryland	Bill Lauckner	Verlin Koenig
Valley, irrigated	Kelly Donovan	Verlin Koenig
Wibaux, dryland	David Maus	Dave Bertelsen

MATERIALS AND METHODS: Eighteen spring wheat varieties were planted at six dryland and two 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	21 May	31 Aug
Circle, McCone County – dryland	14 May	26 Aug
Poplar, Roosevelt County – dryland	18 May	30 Aug
Reserve, Sheridan County – dryland	18 May	1 Sep
Dagmar, Sheridan County – irrigated	18 May	7 Sep
Nashua, Valley County – dryland	4 May	Hailed out
Larslan, Valley County – irrigated	4 May	8 Sep
Wibaux, Wibaux County – dryland	25 May	9 Sep

RESULTS: Summaries of yields, test weights, heights and protein contents across **dryland sites** are shown in Tables 1-4, and summaries of yields, test weights, heights and protein contents across **irrigated sites** are shown in Tables 22-25. Ivan and Reeder yielded most across dryland (Table 1) and irrigated sites (Table 25).

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

Wibaux County: Performance and relative economic values of spring wheat varieties at **Wibaux** are shown in Tables 9-12. Amidon and Parshall produced the greatest economic return.

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

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

Daniels County (dryland): Performance and relative economic values of spring wheat varieties at **Scobey** are shown in Table 21. Ivan produced the greatest economic return. This is the first year for a dryland yield trial in Daniels County, so no relative tables are yet available.

Sheridan County (irrigated): Performance and relative economic values of spring wheat varieties at **Dagmar** are shown in Tables 26-29. Reeder produced the greatest economic return.

Valley County (irrigated): Performance and relative economic values of spring wheat varieties at **Larslan** are shown in Tables 30-33. Reeder and Parshall produced the greatest economic return.

SUMMARY: The off-station yield trials are conducted at several sites in eastern Montana. These trials provide important information about performance in the Mondak region of experimental lines from Montana and North Dakota, and new varieties from state breeding programs 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 five dryland off-station sites in eastern Montana, 1999.

Variety	Circle	Wibaux	Poplar	Reserve	Scobey	average
Ivan	43.9	35.8	47.8	43.1	**64.2**	47.0
Reeder	45.6	37.6	**49.8**	**49.8**	51.3	46.8
Amidon	**49.5**	38.6	43.8	37.5	59.5	45.8
Parshall	42.3	**40.3**	47.4	42.3	48.3	44.1
Norpro	36.3	37.5	43.5	39.8	54.7	42.4
Scholar	40.6	34.8	45.3	36.2	53.9	42.2
Hagar	40.0	32.6	45.6	39.7	51.0	41.8
Grandin	45.2	35.6	43.6	33.7	49.8	41.6
McNeal	43.7	29.5	46.7	37.3	50.1	41.5
Ernest	37.2	35.2	41.6	37.5	53.3	41.0
Newana	33.8	34.0	43.5	39.3	49.6	40.0
Argent	39.8	33.7	41.5	37.3	47.7	40.0
MTHW9420	40.2	32.0	44.6	31.5	48.6	39.4
377S	38.6	35.0	43.0	33.5	46.6	39.3
MTHW9701	34.7	33.3	38.7	38.3	45.9	38.2
Conan	36.2	30.8	35.4	32.1	50.7	37.0
Lew	33.5	30.4	35.6	31.9	46.2	35.5
McVey	--	--	46.0	49.7	58.8	51.5
Hi-Line	40.6	26.8	--	--	--	33.7
site average	40.1	34.1	43.5	38.4	51.7	
p value	0.003	0.002	0.000	0.000	0.011	
CV (S/Mean)	11.0	9.8	6.7	9.1	10.6	
CV(SE/Mean)	6.4	5.6	3.9	5.3	6.1	
$LSD_{0.05}$	7.3	5.5	4.8	5.8	9.1	
Planting date	14 May	25 May	18 May	18 May	21 May	
Harvest date	26 Aug	9 Sep	30 Aug	1 Sep	31 Aug	

Nashua site hailed out 21 July.

Cooperators:

County	Producer	CES Agent
Sheridan Co	Max Aasheim	Terry Angvick
Wibaux Co	David Maus	Dave Bertelsen
McCone Co	Victor Wagner	Nels Boe
Roosevelt Co	Mark Swank	Chet Hill
Valley Co (hailed out)	Bill Lauckner	Verlin Koenig
Daniels Co	Bobbie Roos	Bobbie Roos

Table 2. Summary of spring wheat test weights in lb/bu at five dryland off-station sites in eastern Montana, 1999.

Variety	Circle	Wibaux	Poplar	Reserve	Scobey	average
Parshall	63.0	61.1	61.0	63.7	62.9	62.3
Reeder	63.0	59.7	61.0	63.2	62.9	62.0
Argent	63.3	59.6	61.7	63.0	62.2	62.0
Norpro	63.5	59.2	61.5	62.5	62.8	61.9
Ivan	63.3	58.8	61.5	62.8	62.6	61.8
Scholar	63.3	59.7	60.5	62.7	62.7	61.8
Conan	62.8	59.9	60.0	62.8	62.2	61.5
Lew	63.0	59.1	60.0	62.5	62.4	61.4
Newana	63.0	58.0	60.0	62.7	62.6	61.3
Ernest	62.3	58.5	60.7	62.3	62.3	61.2
MTHW9420	63.2	57.5	59.8	61.8	63.0	61.1
Grandin	62.2	58.2	60.5	62.7	61.4	61.0
Hagar	62.0	58.4	60.0	62.5	61.6	60.9
Amidon	61.7	58.0	60.0	62.0	62.0	60.7
377S	63.0	57.3	59.3	61.3	61.7	60.5
McNeal	61.0	58.4	59.3	61.0	61.7	60.3
MTHW9701	61.2	56.7	59.2	61.3	61.2	59.9
McVey	--	--	58.2	60.7	60.2	59.7
Hi-Line	61.7	56.7	--	--	--	59.2
site average	62.6	58.6	60.2	62.3	62.1	
p value	0.000	0.000	0.000	0.000	0.000	
CV (S/Mean)	0.6	0.9	0.5	0.7	0.9	
CV(SE/Mean)	0.3	0.5	0.3	0.4	0.5	
$LSD_{0.05}$	0.6	0.9	0.5	0.7	0.9	
Planting date	14 May	25 May	18 May	18 May	21 May	
Harvest date	26 Aug	9 Sep	30 Aug	1 Sep	31 Aug	

Nashua site hailed out 21 July.

Cooperators:

County	Producer	CES Agent
Sheridan Co	Max Aasheim	Terry Angvick
Wibaux Co	David Maus	Dave Bertelsen
McCone Co	Victor Wagner	Nels Boe
Roosevelt Co	Mark Swank	Chet Hill
Valley Co (hailed out)	Bill Lauckner	Verlin Koenig
Daniels Co	Bobbie Roos	Bobbie Roos

Table 3. Summary of spring wheat heights in inches at five dryland off-station sites in eastern Montana, 1999.

Variety	Circle	Wibaux	Poplar	Reserve	Scobey	average
Ivan	25	25	27	27	25	26
Amidon	34	33	34	33	39	35
Norpro	26	25	28	27	28	27
Scholar	31	32	34	31	35	33
Ernest	33	30	34	33	35	33
Reeder	28	29	30	30	29	29
Hagar	28	25	29	29	29	28
Conan	27	27	29	28	27	28
McNeal	30	27	31	30	30	30
Grandin	32	30	31	29	32	31
Newana	25	26	28	27	29	27
MTHW9420	25	27	28	25	28	27
Parshall	32	31	34	34	33	33
Argent	30	31	31	30	32	31
377S	26	28	30	28	27	28
Lew	31	33	34	32	33	33
MTHW9701	25	25	26	25	26	25
McVey	--	--	31	31	30	31
Hi-Line	27	26	--	--	--	26
site average	28.8	28.4	30.4	29.5	30.5	
p value	0.000	0.000	0.000	0.000	0.000	
CV (S/Mean)	5.0	5.5	4.2	5.3	5.7	
CV(SE/Mean)	2.9	3.2	2.4	3.1	3.3	
$LSD_{0.05}$	2.4	2.6	2.1	2.6	2.9	
Planting date	14 May	25 May	18 May	18 May	21 May	
Harvest date	26 Aug	9 Sep	30 Aug	1 Sep	31 Aug	

Nashua site hailed out 21 July.

Cooperators:

County	Producer	CES Agent
Sheridan Co	Max Aasheim	Terry Angvick
Wibaux Co	David Maus	Dave Bertelsen
McCone Co	Victor Wagner	Nels Boe
Roosevelt Co	Mark Swank	Chet Hill
Valley Co (hailed out)	Bill Lauckner	Verlin Koenig
Daniels Co	Bobbie Roos	Bobbie Roos

Table 4. Summary of spring wheat grain protein contents as percent at five dryland off-station sites in eastern Montana, 1999.

Variety	Circle	Wibaux	Poplar	Reserve	Scobey	average
Argent	13.4	**14.3**	**15.6**	14.9	**12.3**	14.1
Parshall	14.9	12.7	**15.6**	**15.0**	11.1	13.9
Grandin	14.1	13.8	15.1	14.0	11.4	13.7
Reeder	**15.3**	13.0	15.0	13.8	10.4	13.5
Norpro	12.4	13.2	15.3	14.1	11.0	13.2
Ernest	13.8	13.7	14.8	13.6	10.0	13.2
Hagar	14.4	13.1	14.5	13.2	10.5	13.1
Conan	12.9	13.4	14.7	13.6	11.0	13.1
Scholar	13.8	13.1	14.8	13.0	10.2	13.0
Amidon	13.4	13.6	14.1	13.1	10.0	12.8
Lew	11.4	13.3	14.2	12.6	10.2	12.3
377S	11.6	13.2	13.6	11.3	10.2	12.0
MTHW9420	11.0	12.1	13.9	12.1	10.3	11.9
McNeal	12.4	11.8	13.5	11.6	9.6	11.8
MTHW9701	11.3	12.9	13.3	11.3	9.4	11.6
Ivan	12.2	11.5	12.8	11.7	9.4	11.5
Newana	10.2	11.8	12.7	11.7	8.6	11.0
McVey	--	--	13.6	11.2	9.3	11.4
Hi-Line	14.6	13.4	--	--	--	14.0
site average	13.0	13.0	14.3	12.9	10.3	
p value	0.009	0.005	0.000	0.000	0.66	
CV (S/Mean)	12.2	5.9	2.7	2.6	16.2	
CV(SE/Mean)	7.0	3.4	1.5	1.5	9.3	
$LSD_{0.05}$	2.6	1.3	0.6	0.6	NS	
Planting date	14 May	25 May	18 May	18 May	21 May	
Harvest date	26 Aug	9 Sep	30 Aug	1 Sep	31 Aug	

Nashua site hailed out 21 July.

Cooperators:

County	Producer	CES Agent
Sheridan Co	Max Aasheim	Terry Angvick
Wibaux Co	David Maus	Dave Bertelsen
McCone Co	Victor Wagner	Nels Boe
Roosevelt Co	Mark Swank	Chet Hill
Valley Co (hailed out)	Bill Lauckner	Verlin Koenig
Daniels Co	Bobbie Roos	Bobbie Roos

Table 5. Performance of spring wheat grown under dryland continuous cropping conditions at Circle, MT. Planted: 14 May 1999 Harvested: 26 August 1999 Cooperator: Victor Wagner

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Amidon	34	13.4	61.7	49.5	42.49
Reeder	28	15.3	63.0	45.6	40.36
Grandin	32	14.1	62.2	45.2	29.17
Parshall	32	14.9	63.0	42.3	22.64
Hi-Line	27	14.6	61.7	40.6	9.45
Hagar	28	14.4	62.0	40.0	6.28
Scholar	31	13.8	63.3	40.6	1.73
McNeal	30	12.4	61.0	43.7	0.00
Ivan	25	12.2	63.3	43.9	-2.14
Ernest	33	13.8	62.3	37.2	-15.54
Conan	27	12.9	62.8	36.2	-30.39
Norpro	26	12.4	63.5	36.3	-34.63
Newana	25	10.2	63.0	33.8	-50.72
Lew	31	11.4	63.0	33.5	-52.09
MTHW9420	25	11.0	63.2	40.2	**
Argent	30	13.4	63.3	39.8	**
377S	26	11.6	63.0	38.6	**
MTHW9701	25	11.3	61.2	34.7	**
average	28.8	13.0	62.6	40.1	
p value	0.000	0.009	0.000	0.003	
CV (S/Mean)	5.1	12.2	0.6	11.0	
CV(SE/Mean)	2.9	7.0	0.3	6.4	
LSD 0.05	2.4	2.6	0.6	7.3	

[1]Wheat prices summarized by Gregg Carlson, NARC, Havre, MT, from 5-year average of daily market values for PNW, supplied by the Montana Wheat and Barley Committee

** 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Amidon	32.6	19.5	21.3	44.6	49.5	33.5	112.5
Reeder	--	--	--	47.6	45.6	46.6	109.8
McNeal	29.4	16.2	18.4	41.2	43.7	29.8	100.0
Scholar	--	--	23.6	35.3	40.6	33.2	96.3
Grandin	25.0	16.3	19.1	35.0	45.2	28.1	94.4
Parshall	--	--	--	37.7	42.3	40.0	94.2
Ernest	28.6	17.7	19.9	36.5	37.2	28.0	94.0
Hagar	--	--	--	38.6	40.0	39.3	92.6
Ivan	--	--	--	34.7	43.9	39.3	92.6
Argent	--	--	--	36.8	39.8	38.3	90.2
Lew	28.5	16.0	17.3	38.2	33.5	26.7	89.7
Hi-Line	22.5	15.9	--	--	40.6	26.3	88.5
377S	--	--	--	--	38.6	38.6	88.3
MTHW9420	--	--	17.5	31.3	40.2	29.7	86.2
Norpro	--	--	--	--	36.3	36.3	83.1
Conan	--	--	--	--	36.2	36.2	82.8
Newana	26.8	14.6	15.2	30.6	33.8	24.2	81.3
MTHW9701	--	--	--	--	34.7	34.7	79.4

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 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Norpro	--	--	--	--	63.5	63.5	104.1
Argent	--	--	--	62.8	63.3	63.1	103.6
Grandin	64.5	62.7	65.2	62.0	62.2	63.3	103.3
377S	--	--	--	--	63	63.0	103.3
Ivan	--	--	--	62.3	63.3	62.8	103.2
Conan	--	--	--	--	62.8	62.8	103.0
MTHW9420	--	--	64.4	60.5	63.2	62.7	102.8
Scholar	--	--	63.6	61.2	63.3	62.7	102.8
Parshall	--	--	--	62.1	63.0	62.6	102.8
Newana	64.1	62.8	63.7	61.2	63.0	63.0	102.7
Ernest	63.2	63.0	64.4	61.8	62.3	62.9	102.7
Lew	63.8	62.4	63.8	61.7	63.0	62.9	102.7
Reeder	--	--	--	61.7	63.0	62.4	102.5
Amidon	63.8	62.4	63.2	61.5	61.7	62.5	102.0
Hagar	--	--	--	61.5	62.0	61.8	101.5
Hi-Line	62.5	62.5	--	--	61.7	62.2	101.1
MTHW9701	--	--	--	--	61.2	61.2	100.3
McNeal	63.3	60.3	61.2	60.7	61.0	61.3	100.0

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 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Reeder	--	--	--	13.6	15.3	14.5	120.4
Parshall	--	--	--	13.6	14.9	14.3	118.8
Argent	--	--	--	14.0	13.4	13.7	114.2
Hagar	--	--	--	12.8	14.4	13.6	113.3
Scholar	--	--	13.7	14.0	13.8	13.8	110.7
Ernest	14.0	12.8	14.0	13.8	13.8	13.7	106.2
Grandin	13.3	12.6	13.8	14.2	14.1	13.6	105.6
Hi-Line	13.8	12.9	--	--	14.6	13.8	105.1
Conan	--	--	--	--	12.9	12.9	104.0
McNeal	13.8	13.1	13.5	11.6	12.4	12.9	100.0
Norpro	--	--	--	--	12.4	12.4	100.0
Amidon	12.8	11.6	13.5	12.5	13.4	12.8	99.1
MTHW9420	--	--	13.8	12.3	11.0	12.4	98.9
Lew	12.9	12.5	13.4	12.3	11.4	12.5	97.0
Ivan	--	--	--	11.0	12.2	11.6	96.7
Newana	13.1	12.6	12.8	11.9	10.2	12.1	94.1
377S	--	--	--	--	11.6	11.6	93.5
MTHW9701	--	--	--	--	11.3	11.3	91.1

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: 25 May 1999 Harvested: 9 September 1999 Cooperator: David Maus

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Amidon	33	13.6	58.0	38.6	58.39
Parshall	31	12.7	61.1	40.3	56.80
Norpro	25	13.2	59.2	37.5	49.33
Reeder	29	13.0	59.7	37.6	46.63
Grandin	30	13.8	58.2	35.6	46.62
Ernest	30	13.7	58.5	35.2	44.59
Scholar	32	13.1	59.7	34.8	33.16
Ivan	25	11.5	58.8	35.8	28.67
Hagar	25	13.1	58.4	32.6	22.58
Newana	26	11.8	58.0	34.0	20.56
Conan	27	13.4	59.9	30.8	19.47
Lew	33	13.3	59.1	30.4	14.74
McNeal	27	11.8	58.4	29.5	0.00
McVey	26	13.4	56.7	26.8	-0.49
377S	28	13.2	57.3	35.0	**
Argent	31	14.3	59.6	33.7	**
MTHW9701	25	12.9	56.7	33.3	**
MTHW9420	27	12.1	57.5	32.0	**
average	28.4	13.0	58.6	34.1	
p value	0.000	0.005	0.000	0.002	
CV (S/Mean)	5.5	5.9	0.9	9.8	
CV(SE/Mean)	3.2	3.4	0.5	5.6	
LSD 0.05	2.6	1.3	0.9	5.5	

[1]Wheat prices summarized by Gregg Carlson, NARC, Havre, MT, from 5-year average of daily market values for PNW, supplied by the Montana Wheat and Barley Committee

** 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Norpro	--	--	--	--	37.5	37.5	127.1
377S	--	--	--	--	35.0	35.0	118.6
Reeder	--	--	--	59.8	37.6	48.7	113.4
MTHW9701	--	--	--	--	33.3	33.3	112.9
Parshall	--	--	--	55.3	40.3	47.8	111.3
Ivan	--	--	--	57.7	35.8	46.8	108.8
Hagar	--	--	--	58.7	32.6	45.7	106.3
Conan	--	--	--	--	30.8	30.8	104.4
Argent	--	--	--	54.1	33.7	43.9	102.2
Scholar	--	--	43.5	51.0	34.8	43.1	101.6
McNeal	32.8	38.2	41.4	56.4	29.5	39.7	100.0
Amidon	28.6	33.4	44.4	51.4	38.6	39.3	99.0
Newana	25.8	29.4	43.8	57.1	34.0	38.0	95.9
MTHW9420	--	--	37.1	52.6	32.0	40.6	95.6
Grandin	24.1	29.8	41.9	53.4	35.6	37.0	93.2
Ernest	27.8	37.0	34.5	49.5	35.2	36.8	92.8
Lew	26.1	30.6	37.6	52.0	30.4	35.3	89.1
HiLine	17.5	36.8	--	--	26.8	27.0	80.7

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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Parshall	--	--	--	61.0	61.1	61.1	103.3
Conan	--	--	--	--	59.9	59.9	102.6
Lew	62.2	62.7	61.2	61.3	59.1	61.3	102.4
Argent	--	--	--	61.2	59.6	60.4	102.2
Scholar	--	--	60.8	59.8	59.7	60.1	101.9
Reeder	--	--	--	60.5	59.7	60.1	101.7
Ivan	--	--	--	61.2	58.8	60.0	101.5
Norpro	--	--	--	--	59.2	59.2	101.4
Newana	62.6	62.7	59.7	59.2	58.0	60.4	101.0
Ernest	61.4	62.0	59.8	60.3	58.5	60.4	100.9
Grandin	62.7	61.8	60.5	58.7	58.2	60.4	100.9
Amidon	62.1	61.5	60.0	59.7	58.0	60.3	100.7
McNeal	61.6	60.8	58.7	59.8	58.4	59.9	100.0
Hagar	--	--	--	59.7	58.4	59.1	99.9
HiLine	60.8	62.2	--	--	56.7	59.9	99.4
MTHW9420	--	--	58.8	57.3	57.5	57.9	98.1
377S	--	--	--	--	57.3	57.3	98.1
MTHW9701	--	--	--	--	56.7	56.7	97.1

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 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Argent	--	--	--	16.6	14.3	15.5	116.6
Conan	--	--	--	--	13.4	13.4	113.6
Norpro	--	--	--	--	13.2	13.2	111.9
377S	--	--	--	--	13.2	13.2	111.9
Reeder	--	--	--	16.6	13.0	14.8	111.7
Parshall	--	--	--	16.8	12.7	14.8	111.3
MTHW9701	--	--	--	--	12.9	12.9	109.3
Scholar	--	--	14.4	16.1	13.1	14.5	107.4
HiLine	13.0	12.6	--	--	13.4	13.0	107.1
Grandin	12.5	12.2	14.3	16.3	13.8	13.8	106.0
Ernest	13.0	12.0	14.6	15.5	13.7	13.8	105.5
Hagar	--	--	--	14.7	13.1	13.9	104.9
Amidon	12.8	11.7	14.2	15.3	13.6	13.5	103.7
Lew	13.1	12.6	13.3	14.9	13.3	13.4	103.1
McNeal	12.1	12.5	14.1	14.7	11.8	13.0	100.0
MTHW9420	--	--	13.6	14.5	12.1	13.4	99.0
Newana	11.3	11.6	13.1	14.0	11.8	12.4	94.8
Ivan	--	--	--	13.5	11.5	12.5	94.3

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: 18 May 1999 Harvested: 30 August 1999 Cooperator: Mark Swank

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Reeder	30	15.0	61.0	49.8	34.40
Parshall	34	15.6	61.0	47.4	21.51
Scholar	34	14.8	60.5	45.3	7.97
Hagar	29	14.5	60.0	45.6	7.28
Grandin	31	15.1	60.5	43.6	1.10
Norpro	28	15.3	61.5	43.5	0.57
McNeal	31	13.5	59.3	46.7	0.00
McVey	31	13.6	58.2	46.0	-3.49
Ivan	27	12.8	61.5	47.8	-6.46
Amidon	34	14.1	60.0	43.8	-6.58
Ernest	34	14.8	60.7	41.6	-11.72
Newana	28	12.7	60.0	43.5	-26.84
Conan	29	14.7	60.0	35.4	-44.70
Lew	34	14.2	60.0	35.6	-47.20
MTHW9420	28	13.9	59.8	44.6	**
377S	30	13.6	59.3	43.0	**
Argent	31	15.6	61.7	41.5	**
MTHW9701	26	13.3	59.2	38.7	**
average	30.4	14.3	60.2	43.5	
p value	0.000	0.000	0.000	0.000	
CV (S/Mean)	4.2	2.7	0.5	6.7	
CV(SE/Mean)	2.4	1.5	0.3	3.9	
LSD 0.05	2.1	0.6	0.5	4.8	

[1]Wheat prices summarized by Gregg Carlson, NARC, Havre, MT, from 5-year average of daily market values for PNW, supplied by the Montana Wheat and Barley Committee

* 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Reeder	--	--	--	50.7	49.8	50.3	104.4
McNeal	38.1	24.7	25.8	49.6	46.7	37.0	100.0
Amidon	37.2	25.8	26.5	49.7	43.8	36.6	99.0
McVey	--	--	--	--	46.0	46.0	98.5
Scholar	--	--	25.5	48.1	45.3	39.6	97.4
Hagar	--	--	--	45.8	45.6	45.7	94.9
Ivan	--	--	--	42.1	47.8	45.0	93.4
Norpro	--	--	--	--	43.5	43.5	93.1
Grandin	33.8	21.9	23.1	48.3	43.6	34.1	92.3
377S	--	--	--	--	43.0	43.0	92.1
Argent	--	--	--	46.0	41.5	43.8	90.9
Parshall	--	--	--	40.0	47.4	43.7	90.8
Ernest	34.0	23.4	21.2	46.8	41.6	33.4	90.3
Newana	33.5	20.3	22.3	45.8	43.5	33.1	89.5
MTHW9420	--	--	18.3	39.3	44.6	34.1	83.7
Lew	32.8	19.5	22.0	44.2	35.6	30.8	83.3
MTHW9701	--	--	--	--	38.7	38.7	82.9
Conan	--	--	--	--	35.4	35.4	75.8

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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Norpro	--	--	--	--	61.5	61.5	103.7
Argent	--	--	--	62.8	61.7	62.3	103.2
Reeder	--	--	--	63.0	61.0	62.0	102.8
Parshall	--	--	--	62.8	61.0	61.9	102.7
Ivan	--	--	--	62.0	61.5	61.8	102.4
Scholar	--	--	62.8	62.3	60.5	61.9	102.3
Ernest	59.0	61.3	63.3	63.0	60.7	61.5	102.3
MTHW9420	--	--	64.2	61.0	59.8	61.7	102.0
Lew	59.9	59.5	64.0	62.7	60.0	61.2	101.9
Grandin	58.3	60.9	64.1	62.2	60.5	61.2	101.8
Hagar	--	--	--	62.2	60.0	61.1	101.3
Newana	58.5	60.3	64.7	60.7	60.0	60.8	101.2
Conan	--	--	--	--	60.0	60.0	101.2
Amidon	58.5	60.3	62.0	61.7	60.0	60.5	100.7
McNeal	58.8	60.3	60.8	61.3	59.3	60.1	100.0
377S	--	--	--	--	59.3	59.3	100.0
MTHW9701	--	--	--	--	59.2	59.2	99.8
McVey	--	--	--	--	58.2	58.2	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 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Parshall	--	--	--	16.8	15.6	16.2	117.4
Argent	--	--	--	16.1	15.6	15.9	114.9
Norpro	--	--	--	--	15.3	15.3	113.3
Reeder	--	--	--	15.4	15.0	15.2	110.1
Conan	--	--	--	--	14.7	14.7	108.9
Hagar	--	--	--	15.2	14.5	14.9	107.6
Scholar	--	--	15.2	15.2	14.8	15.1	104.4
Grandin	15.1	14.1	15.5	15.4	15.1	15.0	103.3
Ernest	15.0	14.0	15.6	15.0	14.8	14.9	102.2
McVey	--	--	--	--	13.6	13.6	100.7
377S	--	--	--	--	13.6	13.6	100.7
Lew	14.9	14.8	15.0	14.2	14.2	14.6	100.4
McNeal	15.3	14.2	15.7	14.1	13.5	14.6	100.0
MTHW9420	--	--	15.0	13.9	13.9	14.3	98.8
MTHW9701	--	--	--	--	13.3	13.3	98.5
Amidon	14.5	13.4	14.6	13.4	14.1	14.0	96.2
Newana	14.1	13.5	14.8	12.7	12.7	13.6	93.1
Ivan	--	--	--	12.6	12.8	12.7	92.0

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: 18 May 1999 Harvested: 1 September 1999 Cooperator: Max Aasheim

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Reeder	30	13.8	63.2	49.8	83.26
Parshall	34	15.0	63.7	42.3	57.43
McVey	31	11.2	60.7	49.7	56.42
Norpro	27	14.1	62.5	39.8	36.05
Ivan	27	11.7	62.8	43.1	26.38
Hagar	29	13.2	62.5	39.7	24.81
Ernest	33	13.6	62.3	37.4	16.91
Amidon	33	13.1	62.0	37.5	10.66
Newana	27	11.7	62.7	39.3	9.10
Grandin	29	14.0	62.7	33.7	4.51
Scholar	31	13.0	62.7	36.2	4.40
McNeal	30	11.6	61.0	37.3	0.00
Conan	28	13.6	62.8	32.1	-9.54
Lew	32	12.6	62.5	31.9	-20.43
MTHW9701	25	11.3	61.3	38.3	**
Argent	30	14.9	63.0	37.3	**
377S	28	11.3	61.3	33.5	**
MTHW9420	25	12.1	61.8	31.5	**
average	29.5	12.9	62.3	38.4	
p value	0.000	0.000	0.000	0.000	
CV (S/Mean)	5.3	2.6	0.7	9.1	
CV(SE/Mean)	3.1	1.5	0.4	5.3	
$LSD_{0.05}$	2.6	0.6	0.7	5.8	

[1]Wheat prices summarized by Gregg Carlson, NARC, Havre, MT, from 5-year average of daily market values for PNW, supplied by the Montana Wheat and Barley Committee

** 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
McVey	--	--	--	--	49.7	49.7	133.2
Reeder	--	--	--	50.6	49.8	50.2	124.7
Ivan	--	--	--	47.8	43.1	45.5	112.9
Norpro	--	--	--	--	39.8	39.8	106.7
Hagar	--	--	--	45.8	39.7	42.8	106.2
MTHW9701	--	--	--	--	38.3	38.3	102.7
Scholar	--	--	33.6	46.2	36.2	38.7	102.0
McNeal	29.9	45.8	33.2	43.2	37.3	37.9	100.0
Parshall	--	--	--	36.9	42.3	39.6	98.4
Amidon	28.5	39.2	31.4	40.4	37.5	35.4	93.5
Newana	27.0	43.0	25.5	41.3	39.3	35.2	93.0
Argent	--	--	--	37.2	37.3	37.3	92.5
Ernest	26.2	43.2	26.4	37.0	37.4	34.0	89.9
377S	--	--	--	--	33.5	33.5	89.8
Conan	--	--	--	--	32.1	32.1	86.1
Lew	26.6	37.9	26.9	36.6	31.9	32.0	84.4
Grandin	23.6	35.7	26.8	37.0	33.7	31.4	82.8
MTHW9420	--	--	19.2	39.4	31.5	30.0	79.2

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 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Parshall	--	--	--	62.3	63.7	63.0	103.1
Conan	--	--	--	--	62.8	62.8	103.0
Ivan	--	--	--	62.5	62.8	62.7	102.5
Norpro	--	--	--	--	62.5	62.5	102.5
Argent	--	--	--	61.5	63.0	62.3	101.9
Hagar	--	--	--	62.0	62.5	62.3	101.9
Lew	63.1	64.2	60.5	62.0	62.5	62.5	101.7
Scholar	--	--	61	61.5	62.7	61.7	101.6
Reeder	--	--	--	60.7	63.2	62.0	101.4
Grandin	62.7	64.3	61.6	59.8	62.7	62.2	101.3
Newana	62.0	63.8	61.7	60.3	62.7	62.1	101.1
Ernest	60.7	63.8	61.4	61.2	62.3	61.9	100.7
MTHW9701	--	--	--	--	61.3	61.3	100.5
377S	--	--	--	--	61.3	61.3	100.5
Amidon	61.7	63.7	60.0	60.2	62.0	61.5	100.2
McNeal	61.9	63.0	60.0	61.2	61.0	61.4	100.0
McVey	--	--	--	--	60.7	60.7	99.5
MTHW9420	--	--	60.6	58.7	61.8	60.4	99.4

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 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	1995	1996	1997	1998	1999	Ave	as % of McNeal
Norpro	--	--	--	--	14.1	14.1	121.6
Parshall	--	--	--	15.8	15.0	15.4	120.3
Conan	--	--	--	--	13.6	13.6	117.2
Argent	--	--	--	14.7	14.9	14.8	115.6
Reeder	--	--	--	14.6	13.8	14.2	110.9
Hagar	--	--	--	14.3	13.2	13.8	107.4
Scholar	--	--	14.6	14.6	13.0	14.1	107.1
Grandin	10.3	14.0	14.7	14.7	14.0	13.5	106.3
Ernest	10.4	14.4	14.2	14.8	13.6	13.5	105.8
MTHW9420	--	--	13.9	13.8	12.1	13.3	101.0
Amidon	10.0	14.0	13.6	13.3	13.1	12.8	100.5
Lew	10.3	13.3	13.5	14.1	12.6	12.8	100.2
McNeal	10.4	13.9	13.8	14.0	11.6	12.7	100.0
MTHW9701	--	--	--	--	11.3	11.3	97.4
377S	--	--	--	--	11.3	11.3	97.4
McVey	--	--	--	--	11.2	11.2	96.6
Newana	9.8	13.0	13.4	12.8	11.7	12.1	95.3
Ivan	--	--	--	12.0	11.7	11.9	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 protein contents only to the check variety.

Table 21. Performance of spring wheat grown under dryland conditions at Scobey, MT.
Planted: 21 May 1999 Harvested: 31 August 1999 Cooperator: Bobbie Roos

Variety	Height, inches	Grain protein	Test Weight	Yield Bu/acre	$/acre[1] +/- McNeal
Ivan	25	9.4	62.6	64.2	64.16
Amidon	39	10.0	62.0	59.5	42.77
McVey	30	9.3	60.2	58.8	39.59
Norpro	28	11.0	62.8	54.7	20.93
Scholar	35	10.2	62.7	53.9	17.29
Ernest	35	10.0	62.3	53.3	14.56
Reeder	29	10.4	62.9	51.3	5.46
Hagar	29	10.5	61.6	51.0	4.10
Conan	27	11.0	62.2	50.7	2.73
McNeal	30	9.6	61.7	50.1	0.00
Grandin	32	11.4	61.4	49.8	-1.36
Newana	29	8.6	62.6	49.6	-2.28
Parshall	33	11.1	62.9	48.3	-8.19
Lew	33	10.2	62.4	46.2	-17.75
MTHW9420	28	10.3	63.0	48.6	**
Argent	32	12.3	62.2	47.7	**
377S	27	10.2	61.7	46.6	**
MTHW9701	26	9.4	61.2	45.9	**
average	30.5	10.3	62.1	51.7	
p value	0.000	0.66	0.000	0.011	
CV (S/Mean)	5.7	16.2	0.9	10.6	
CV(SE/Mean)	3.3	9.3	0.5	6.1	
LSD 0.05	2.9	NS	0.9	9.1	

[1]Wheat prices summarized by Gregg Carlson, NARC, Havre, MT, from 10-year average of daily market values for PNW, supplied by the Montana Wheat and Barley Committee.

** No average price for hard white wheat available at this time.

Table 22. Summary of spring wheat yields in bu/acre at two irrigated off-station sites in eastern Montana, 1999. Both sites are under pivot irrigation.

Variety	Dagmar	Larslan	average
Reeder	63.6	**83.2**	73.4
Ivan	**66.1**	76.0	71.1
Norpro	59.9	79.6	69.8
Parshall	59.9	77.6	68.8
Ernest	56.8	74.5	65.7
McNeal	53.9	75.2	64.6
Argent	55.5	73.4	64.5
Grandin	52.0	74.1	63.1
MTHW9420	47.4	77.3	62.4
Amidon	53.6	70.9	62.3
Hagar	46.5	73.5	60.0
Conan	45.3	71.4	58.4
Newana	41.1	68.0	54.6
MTHW9701	41.9	65.3	53.6
377S	48.3	55.7	52.0
Scholar	38.3	61.0	49.7
Lew	32.7	50.5	41.6
McVey	51.5	--	
Hi-Line	--	61.7	
site average	50.8	70.0	
p value	0.000	0.000	
CV (S/Mean)	11.8	8.5	
CV(SE/Mean)	6.8	4.9	
$LSD_{0.05}$	9.9	9.9	
Planting date	18 May	4 May	
Harvest date	7 Sep	8 Sep	

Cooperators:

County	Producer	CES Agent
Sheridan Co	Steve Brekke	Terry Angvick
Valley Co	Kelly Donovan	Verlin Koenig

Table 23. Summary of spring wheat test weights as lb/bu at two irrigated off-station sites in eastern Montana, 1999. Both sites are under pivot irrigation.

Variety	Dagmar	Larslan	average
Parshall	61.2	63.0	62.1
Argent	60.0	61.8	60.9
Reeder	60.0	61.5	60.8
Amidon	59.0	60.5	59.8
Ivan	59.0	60.3	59.7
Ernest	58.8	60.2	59.5
Conan	58.3	60.0	59.2
Norpro	58.2	59.8	59.0
Grandin	58.0	59.7	58.9
McNeal	58.0	59.5	58.8
Newana	57.0	59.5	58.3
Scholar	56.8	59.5	58.2
Hagar	56.2	60.0	58.1
Lew	56.2	59.7	58.0
377S	56.3	56.8	56.6
MTHW9420	53.7	57.5	55.6
MTHW9701	53.3	56.5	54.9
McVey	57.3	--	
Hi-Line	--	57.5	
site average	57.6	59.4	
p value	0.000	0.000	
CV (S/Mean)	2.1	1.5	
CV(SE/Mean)	1.2	0.9	
$LSD_{0.05}$	2.0	1.5	
Planting date	18 May	4 May	
Harvest date	7 Sep	8 Sep	

Cooperators:

County	Producer	CES Agent
Sheridan Co	Steve Brekke	Terry Angvick
Valley Co	Kelly Donovan	Verlin Koenig

Table 24. Summary of spring wheat heights in inches at two irrigated off-station sites in eastern Montana, 1999. Both sites are under pivot irrigation.

Variety	Dagmar	Larslan	average
Ivan	36	36	36
Reeder	39	37	38
Parshall	44	43	44
Norpro	34	33	34
Ernest	42	43	42
Argent	37	38	38
McNeal	37	37	37
Amidon	44	41	42
Grandin	37	36	36
377S	34	34	34
MTHW9420	33	33	33
Hagar	36	35	36
Conan	35	34	34
MTHW9701	31	32	32
Newana	36	35	36
Scholar	38	38	38
Lew	41	40	40
McVey	41	--	
Hi-Line	--	34	
site average	37.4	36.4	
p value	0.000	0.000	
CV (S/Mean)	3.1	3.2	
CV(SE/Mean)	1.8	1.9	
$LSD_{0.05}$	1.9	2.0	
Planting date	18 May	4 May	
Harvest date	7 Sep	8 Sep	

Cooperators:

County	Producer	CES Agent
Sheridan Co	Steve Brekke	Terry Angvick
Valley Co	Kelly Donovan	Verlin Koenig

Table 25. Summary of spring wheat grain protein contents as percent at two irrigated off-station sites in eastern Montana, 1999. Both sites are under pivot irrigation.

Variety	Dagmar	Larslan	average
Parshall	**16.5**	14.4	15.5
Reeder	16.1	**14.7**	15.4
Argent	16.0	13.7	14.9
Lew	15.7	14.0	14.9
Ernest	15.7	13.9	14.8
Grandin	15.4	13.4	14.4
Scholar	14.6	13.7	14.2
Hagar	14.8	13.4	14.1
Norpro	14.8	12.8	13.8
Amidon	14.8	12.6	13.7
McNeal	14.1	12.3	13.2
Conan	14.3	12.1	13.2
377S	13.9	12.3	13.1
Newana	13.6	12.1	12.9
MTHW9420	13.5	12.1	12.8
Ivan	13.2	11.9	12.6
MTHW9701	13.2	11.4	12.3
McVey	13.9	--	
Hi-Line	--	12.7	
site average	14.7	12.9	
p value	0.000	0.000	
CV (S/Mean)	2.6	2.6	
CV(SE/Mean)	1.5	1.5	
$LSD_{0.05}$	0.6	0.5	
Planting date	18 May	4 May	
Harvest date	7 Sep	8 Sep	

Cooperators:

County	Producer	CES Agent
Sheridan Co	Steve Brekke	Terry Angvick
Valley Co	Kelly Donovan	Verlin Koenig

Table 26. Performance of spring wheat grown under irrigated conditions at Dagmar, MT.
Planted: 18 May 1999 Harvested: 7 September 1999 Cooperator: Steve Brekke

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Reeder	39	16.1	60.0	63.6	62.87
Ivan	36	13.2	59.0	66.1	45.23
Parshall	44	16.5	61.2	59.9	43.00
Norpro	34	14.8	58.2	59.9	40.00
Ernest	42	15.7	58.8	56.8	26.89
Amidon	44	14.8	59.0	53.6	6.49
Grandin	37	15.4	58.0	52.0	0.58
McNeal	37	14.1	58.0	53.9	0.00
McVey	41	13.9	57.3	51.5	-30.95
Hagar	36	14.8	56.2	46.5	-31.28
Conan	35	14.3	58.3	45.3	-42.20
Newana	36	13.6	57.0	41.1	-73.57
Scholar	38	14.6	56.8	38.3	-76.82
Lew	41	15.7	56.2	32.7	-103.06
Argent	37	16.0	60.0	55.5	**
377S	34	13.9	56.3	48.3	**
MTHW9420	33	13.5	53.7	47.4	**
MTHW9701	31	13.2	53.3	41.9	**
average	37.4	14.7	57.6	50.8	
p value	0.000	0.000	0.000	0.000	
CV (S/Mean)	3.1	2.6	2.1	11.8	
CV(SE/Mean)	1.8	1.5	1.2	6.8	
$LSD_{0.05}$	1.9	0.6	2.0	9.9	

[1]Wheat prices summarized by Gregg Carlson, NARC, Havre, MT, from 5-year average of daily market values for PNW supplied by the Montana Wheat and Barley Committee

** No average price for hard white wheat available at this time.

Table 27. Relative yields of spring wheat varieties as compared to McNeal when grown under irrigated conditions in Sheridan County in cooperation with CES.
Cooperator: Steve Brekke

Cultivar	1992	1993	1996	1998	1999	Ave	as % of McNeal
Reeder	--	--	--	78.4	63.6	71.0	114.3
Norpro	--	--	--	--	59.9	59.9	111.1
Ivan	--	--	--	70.4	66.1	68.3	109.9
Parshall	--	--	--	69.9	59.9	64.9	104.5
Argent	--	--	--	71.4	55.5	63.5	102.2
McNeal	93.9	79.5	48.6	70.3	53.9	69.2	100.0
Amidon	82.5	91.3	53.3	63.7	53.6	68.9	99.5
Ernest	--	--	47.4	67.2	56.8	57.1	99.2
Hagar	--	--	--	75.3	46.5	60.9	98.1
McVey	--	--	--	--	51.5	51.5	95.5
Grandin	--	69.9	38.8	66.5	52.0	56.8	90.1
Newana	83.6	72.5	47.8	65.9	41.1	62.2	89.8
MTHW9420	--	--	--	64.0	47.4	55.7	89.7
377S	--	--	--	--	48.3	48.3	89.6
Scholar	--	--	--	66.1	38.3	52.2	84.1
Conan	--	--	--	--	45.3	45.3	84.0
Lew	--	--	46.5	57.1	32.7	45.4	78.9
MTHW9701	--	--	--	--	41.9	41.9	77.7

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 28. Relative test weights of spring wheat varieties as compared to McNeal when grown under irrigated conditions in Sheridan County in cooperation with CES.
Cooperator: Steve Brekke

Cultivar	1992	1993	1996	1998	1999	Ave	as % of McNeal
Parshall	--	--	--	63.3	61.2	62.3	104.2
Argent	--	--	--	62.8	60.0	61.4	102.8
Reeder	--	--	--	62.0	60.0	61.0	102.1
Ernest	--	--	63.2	62.3	58.8	61.4	101.5
Ivan	--	--	--	61.8	59.0	60.4	101.1
Lew	--	--	63.7	62.7	56.2	60.9	100.6
Conan	--	--	--	--	58.3	58.3	100.5
Norpro	--	--	--	--	58.2	58.2	100.3
Grandin	--	59.8	62.7	61.8	58.0	60.6	100.3
McNeal	59.7	60.1	62.0	61.5	58.0	60.3	100.0
Amidon	59.0	59.5	62.8	60.7	59.0	60.2	99.9
Scholar	--	--	--	61.8	56.8	59.3	99.2
Newana	59.3	57.6	63.3	61.0	57.0	59.6	99.0
McVey	--	--	--	--	57.3	57.3	98.8
Hagar	--	--	--	61.7	56.2	59.0	98.7
377S	--	--	--	--	56.3	56.3	97.1
MTHW9420	--	--	--	59.2	53.7	56.5	94.5
MTHW9701	--	--	--	--	53.3	53.3	91.9

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 29. Relative protein contents of spring wheat varieties as compared to Newana when grown under irrigated conditions in Sheridan County in cooperation with CES.
Cooperator: Steve Brekke

Cultivar	1992	1993	1996	1998	1999	Ave	as % of Newana
Reeder	--	--	--	15.6	16.1	15.9	115.7
Argent	--	--	--	15.6	16.0	15.8	115.3
Parshall	--	--	--	14.7	16.5	15.6	113.9
Lew	--	--	11.7	14.6	15.7	14.0	109.4
Ernest	--	--	10.9	15.2	15.7	13.9	108.9
Scholar	--	--	--	15.0	14.6	14.8	108.0
Grandin	--	15.0	11.2	15.4	15.4	14.3	107.1
Amidon	13.1	15.0	10.8	14.1	14.8	13.6	105.9
Hagar	--	--	--	14.2	14.8	14.5	105.8
Norpro	--	--	--	--	14.8	14.8	105.0
Conan	--	--	--	--	14.3	14.3	101.4
Newana	12.1	14.2	11.2	13.1	13.6	12.8	100.3
McNeal	10.8	14.8	11.0	13.3	14.1	12.8	100.0
McVey	--	--	--	--	13.9	13.9	98.6
377S	--	--	--	--	13.9	13.9	98.6
MTHW9420	--	--	--	13.0	13.5	13.3	96.7
MTHW9701	--	--	--	--	13.2	13.2	93.6
Ivan	--	--	--	11.4	13.2	12.3	89.8

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 30. Performance of spring wheat grown under irrigated conditions at Larslan, MT.
Planted: 4 May 1999 Harvested: 8 September 1999 Cooperator: Kelly Donovan

Variety	Height, inches	Grain protein	Test weight	Yield, bu/acre	$/acre[1] +/- McNeal
Reeder	37	14.7	61.5	83.2	95.95
Parshall	43	14.4	63.0	77.6	62.28
Ernest	43	13.9	60.2	74.5	38.49
Norpro	33	12.8	59.8	79.6	30.63
Grandin	36	13.4	59.7	74.1	23.09
Hagar	35	13.4	60.0	73.5	19.59
McNeal	37	12.3	59.5	75.2	0.00
Ivan	36	11.9	60.3	76.0	-0.87
Amidon	41	12.6	60.5	70.9	-14.86
Conan	34	12.1	60.0	71.4	-21.80
Scholar	38	13.7	59.5	61.0	-36.79
Newana	35	12.1	59.5	68.0	-37.27
McVey	34	12.7	57.5	61.7	-54.21
Lew	40	14.0	59.7	50.5	-85.59
MTHW9420	33	12.1	57.5	77.3	**
Argent	38	13.7	61.8	73.4	**
MTHW9701	32	11.4	56.5	65.3	**
General Mills white	35	12.1	55.7	60.4	**
377S	34	12.3	56.8	55.7	**
average	36.4	12.9	59.4	70.0	
p value	0.000	0.000	0.000	0.000	
CV (S/Mean)	3.2	2.6	1.5	8.5	
CV(SE/Mean)	1.9	1.5	0.9	4.9	
LSD 0.05	2.0	0.5	1.5	9.9	

[1]Wheat prices summarized by Gregg Carlson, NARC, Havre, MT, from 5-year average of daily market values for PNW, supplied by the Montana Wheat and Barley Committee

* No average price for hard white wheat available at this time.

Table 31. Relative yields of spring wheat varieties as compared to McNeal when grown under irrigated conditions in Valley County in cooperation with CES.
Cooperator: Kelly Donovan

Cultivar	1995	1996	1997	1998	1999	Ave	as % of McNeal
Reeder	--	--	--	71.8	83.2	77.5	117.7
Ivan	--	--	--	72.4	76.0	74.2	112.7
Parshall	--	--	--	68.6	77.6	73.1	111.0
Hagar	--	--	--	72.2	73.5	72.9	110.6
Norpro	--	--	--	--	79.6	79.6	105.9
Argent	--	--	--	64.3	73.4	68.9	104.6
Grandin	40.0	64.0	103.5	67.5	74.1	69.8	101.9
Ernest	40.2	65.5	99.2	63.8	74.5	68.6	100.2
McNeal	40.3	71.1	99.5	56.5	75.2	68.5	100.0
MTHW9420	--	--	100.6	47.1	77.3	75.0	97.3
Conan	--	--	--	--	71.4	71.4	94.9
Amidon	33.0	68.4	94.3	54.8	70.9	64.3	93.8
Hi-Line	36.6	68.4	--	--	61.7	55.6	89.3
Newana	34.1	64.9	94.9	42.0	68.0	60.8	88.7
Scholar	--	--	87.5	55.6	61.0	68.0	88.3
MTHW9701	--	--	--	--	65.3	65.3	86.8
Lew	39.8	57.0	66.8	48.3	50.5	52.5	76.6
377S	--	--	--	--	55.7	55.7	74.1

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 32. Relative test weights of spring wheat varieties as compared to McNeal when grown under irrigated conditions in Valley County in cooperation with CES.
Cooperator: Kelly Donovan

Cultivar	1995	1996	1997	1998	1999	Ave	as % of McNeal
Parshall	--	--	--	59.7	63.0	61.4	105.8
Reeder	--	--	--	57.8	61.5	59.7	102.8
Argent	--	--	--	57.5	61.8	59.7	102.8
Ernest	58.7	62.2	61.2	56.3	60.2	59.7	102.8
Lew	61.0	59.3	59.7	58.2	59.7	59.6	102.6
Ivan	--	--	--	57.8	60.3	59.1	101.8
Amidon	58.6	61.0	60.3	54.7	60.5	59.0	101.6
Grandin	58.6	58.3	60.2	56.2	59.7	58.6	100.9
Conan	--	--	--	--	60.0	60.0	100.8
Norpro	--	--	--	--	59.8	59.8	100.5
Hagar	--	--	--	56.3	60.0	58.2	100.3
McNeal	56.8	57.3	60.3	56.5	59.5	58.1	100.0
Hi-Line	57.0	58.5	--	--	57.5	57.7	99.7
Newana	57.0	58.2	59.7	54.2	59.5	57.7	99.4
Scholar	--	--	59.2	55.2	59.5	58.0	98.6
MTHW9420	--	--	58.7	53.5	57.5	56.6	96.3
377S	--	--	--	--	56.8	56.8	95.5
MTHW9701	--	--	--	--	56.5	56.5	95.0

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 33. Relative protein contents of spring wheat varieties as compared to McNeal when grown under irrigated conditions in Valley County in cooperation with CES.
Cooperator: Kelly Donovan

Cultivar	1995	1996	1997	1998	1999	Ave	as % of McNeal
Reeder	--	--	--	15.7	14.7	15.2	113.0
Parshall	--	--	--	15.8	14.4	15.1	112.3
Scholar	--	--	14.9	15.2	13.7	14.6	107.6
Argent	--	--	--	14.9	13.7	14.3	106.3
Lew	15.8	14.8	14.8	15.4	14.0	15.0	106.1
Hagar	--	--	--	14.6	13.4	14.0	104.1
Norpro	--	--	--	--	12.8	12.8	104.1
Ernest	15.7	14.6	13.7	15.1	13.9	14.6	103.5
Grandin	14.8	14.6	13.7	14.7	13.4	14.2	101.0
Hi-Line	15.3	14.4	--	--	12.7	14.1	100.7
McNeal	15.4	14.4	13.8	14.6	12.3	14.1	100.0
377S	--	--	--	--	12.3	12.3	100.0
Amidon	15.3	13.8	13.2	14.6	12.6	13.9	98.6
Conan	--	--	--	--	12.1	12.1	98.4
Newana	15.0	14.1	13.0	14.3	12.1	13.7	97.2
MTHW9420	--	--	12.9	14.4	12.1	13.1	96.8
Ivan	--	--	--	13.4	11.9	12.7	94.1
MTHW9701	--	--	--	--	11.4	11.4	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.