

PROJECT TITLE: Off-station spring wheat yield trials - 1998

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

MATERIALS AND METHODS:

Twenty-four spring wheat varieties were planted at five 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
Circle, McCone County – dryland	23 Apr	6 Aug
Wibaux, Wibaux County – dryland	28 Apr	17 Aug
Poplar, Roosevelt County – dryland	1 May	13 Aug
Reserve, Sheridan County – dryland	1 May	18 Aug
Nashua, Valley County – dryland	17 Apr	31 Jul
Scobey, Daniels County – irrigated	4 May	26 Aug
Dagmar, Sheridan County – irrigated	1 May	18 Aug
Larslan, Valley County – irrigated	17 Apr	25 Aug

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 25-28. ND695 yielded most across dryland and irrigated sites. Performance and relative values of spring wheat varieties for **Circle** are shown in Tables 5-8, for **Wibaux** in Tables 9-12, for **Poplar** in Tables 13-16, for **Reserve** in Tables 17-20, for **Nashua** in Tables 21-24, for **Scobey** in Tables 29-32, for **Dagmar** in Tables 33-36, and for **Larslan** in Tables 37-40.

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, 1998.

Variety	Circle	Wibaux	Poplar	Reserve	Nashua	average
ND695	47.6	59.8	50.7	50.6	49.5	51.6
McNeal	41.2	56.4	49.6	43.2	55.8	49.2
AC Crystal	37.3	59.1	50.3	47.2	49.4	48.7
Hagar	38.6	58.7	45.8	45.8	53.8	48.5
2398	35.2	58.2	46.5	49.0	45.7	46.9
Amidon	44.6	51.4	49.7	40.4	48.4	46.9
Ivan	34.7	57.7	42.1	47.8	50.8	46.6
Scholar	35.3	51.0	48.1	46.2	52.1	46.5
Newana	30.6	57.1	45.8	41.3	54.9	45.9
Lew	38.2	52.0	44.2	36.6	55.4	45.3
Verde	35.1	58.3	44.4	47.0	39.0	44.8
Keene	38.3	52.2	45.8	41.1	45.6	44.6
Trenton	38.1	50.4	45.8	41.0	43.9	43.8
MTHW9420	31.3	52.6	39.3	39.4	54.2	43.4
Grandin	35.0	53.4	48.3	37.0	43.0	43.3
Stoa	35.7	49.8	44.3	42.8	43.6	43.2
Argent	36.8	54.1	46.0	37.2	41.8	43.2
ND694	37.7	55.3	40.0	36.9	44.7	42.9
AC Barrie	35.4	53.4	39.2	38.8	45.4	42.4
Ernest	36.5	49.5	46.8	37.0	39.4	41.8
Nora	30.2	50.4	40.8	38.7	46.3	41.3
2375	35.5	48.0	39.1	36.1	43.8	40.5
Kulm	33.6	50.4	43.3	34.8	38.2	40.1
MT9609	30.8	45.7	40.4	27.6	44.8	37.9
site average	36.4	53.6	44.8	41.0	47.0	
p value	0.000	0.099	0.005	0.000	0.000	
CV (S/Mean)	8.0	10.2	9.1	9.2	9.2	
CV(SE/Mean)	4.6	5.9	5.3	5.3	5.3	
LSD _{0.05}	4.8	8.9	6.7	6.2	7.1	
Planting date	23 Apr	28 Apr	1 May	1 May	17 Apr	
Harvest date	6 Aug	17 Aug	13 Aug	18 Aug	21 Jul	

Cooperators:

County
 Sheridan Co
 Wibaux Co
 McCone Co
 Roosevelt Co
 Valley Co

Producer
 Max Aasheim
 David Maus
 Victor Wagner
 Mark Swank
 Bill Lauckner

CES Agent
 Terry Angvick
 Dave Bertelsen
 Nels Boe
 Chet Hill
 Verlin Koenig

Table 2. Summary of spring wheat test weights in lb/bu at five dryland off-station sites in eastern Montana, 1998.

Variety	Circle	Wibaux	Poplar	Reserve	Nashua	average
Keene	61.8	61.8	63.0	62.7	64.0	62.7
Kulm	62.5	61.5	62.8	62.0	64.0	62.6
Argent	62.8	61.2	62.8	61.5	64.2	62.5
ND694	62.1	61.0	62.8	62.3	64.2	62.5
Ivan	62.3	61.2	62.0	62.5	63.8	62.4
Lew	61.7	61.3	62.7	62.0	63.7	62.3
Ernest	61.8	60.3	63.0	61.2	64.0	62.1
ND695	61.7	60.5	63.0	60.7	64.3	62.0
AC Crystal	61.5	60.5	62.3	61.2	63.8	61.9
Hagar	61.5	59.7	62.2	62.0	63.5	61.8
2398	62.0	60.2	62.0	61.0	63.3	61.7
Trenton	61.8	59.8	62.3	60.7	63.8	61.7
Scholar	61.2	59.8	62.3	61.5	63.3	61.6
Verde	61.3	60.8	61.3	61.2	62.5	61.4
Nora	60.9	59.7	61.5	61.0	63.7	61.4
2375	61.5	59.8	61.7	60.3	63.5	61.4
Grandin	62.0	58.7	62.2	59.8	64.0	61.3
Amidon	61.5	59.7	61.7	60.2	63.0	61.2
AC Barrie	61.2	60.7	61.0	60.3	62.8	61.2
McNeal	60.7	59.8	61.3	61.2	62.5	61.1
Stoa	61.2	59.8	60.7	60.5	63.3	61.1
Newana	61.2	59.2	60.7	60.3	63.3	60.9
MT9609	60.2	59.0	61.5	59.5	62.8	60.6
MTHW9420	60.5	57.3	61.0	58.7	63.5	60.2
site average	61.5	60.1	62.0	61.0	63.5	
p value	0.000	0.011	0.000	0.000	0.000	
CV (S/Mean)	0.8	2.0	0.9	0.9	0.7	
CV(SE/Mean)	0.5	1.1	0.5	0.5	0.4	
LSD 0.05	0.8	1.9	0.9	0.9	0.7	
Planting date	23 Apr	28 Apr	1 May	1 May	17 Apr	
Harvest date	6 Aug	17 Aug	13 Aug	18 Aug	21 Jul	

Cooperators:

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McCone Co
Roosevelt Co
Valley Co

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Nels Boe
Chet Hill
Verlin Koenig

Table 3. Summary of spring wheat heights in inches at five dryland off-station sites in eastern Montana, 1998.

Variety	Circle	Wibaux	Poplar	Reserve	Nashua	average
Trenton	32	39	33	35	32	34.2
Lew	33	40	34	34	29	34.0
Keene	33	38	33	33	31	33.6
Amidon	32	37	34	34	30	33.4
AC Barrie	32	39	33	32	29	33.0
Stoa	31	38	33	32	30	32.8
Scholar	30	36	34	33	29	32.4
Ernest	31	36	33	33	28	32.2
ND694	32	36	30	32	29	31.8
MT9609	29	35	31	32	28	31.0
Argent	30	33	31	28	31	30.6
Kulm	29	35	31	29	27	30.2
Grandin	29	33	30	29	29	30.0
McNeal	29	32	29	30	29	29.8
ND695	28	33	28	30	29	29.6
AC Crystal	28	30	31	31	27	29.4
Verde	28	31	30	29	28	29.2
Newana	27	31	30	28	27	28.6
2398	27	30	30	30	25	28.4
2375	28	32	28	30	24	28.4
Hagar	27	29	27	28	27	27.6
MTHW9420	26	29	29	27	23	26.8
Ivan	24	30	27	27	25	26.6
Nora	24	26	27	25	25	25.4
site average	29.1	33.7	30.8	30.5	28.7	
p value	0.000	0.000	0.000	0.000	0.000	
CV (S/Mean)	4.0	4.0	6.1	5.0	5.7	
CV(SE/Mean)	2.3	2.3	3.5	2.9	3.3	
LSD 0.05	1.9	2.2	3.1	2.5	2.7	
Planting date	23 Apr	28 Apr	1 May	1 May	17 Apr	
Harvest date	6 Aug	17 Aug	13 Aug	18 Aug	21 Jul	

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Table 4. Summary of spring wheat grain protein contents as percent at five dryland off-station sites in eastern Montana, 1998.

Variety	Circle	Wibaux	Poplar	Reserve	Nashua	average
AC Barrie	15.0	16.9	16.7	14.8	16.1	15.90
ND694	13.6	16.8	16.8	15.6	15.4	15.64
Grandin	14.2	16.3	15.2	14.7	15.9	15.26
Kulm	14.6	15.2	15.0	14.5	16.8	15.22
Argent	14.0	16.6	16.1	14.7	14.6	15.20
Ernest	13.8	15.5	15.0	14.8	15.7	14.96
Keene	13.7	15.6	15.8	14.7	14.9	14.94
Trenton	13.4	16.1	15.4	14.3	15.3	14.90
Scholar	14.0	16.1	15.2	14.6	13.8	14.74
ND695	13.6	16.6	15.4	14.6	13.5	14.74
2375	12.8	15.6	14.8	13.9	16.0	14.62
Stoa	13.6	15.4	14.9	14.0	14.5	14.48
Nora	14.0	15.4	14.6	14.5	13.5	14.40
2398	13.1	15.3	14.9	13.7	14.7	14.34
Verde	13.7	14.5	14.5	13.2	15.8	14.34
Hagar	12.8	14.7	15.2	14.3	13.9	14.18
MT9609	12.3	15.1	13.9	14.2	14.8	14.06
Lew	12.3	14.9	14.2	14.1	14.1	13.92
Amidon	12.5	15.3	13.4	13.3	14.7	13.84
MTHW9420	12.3	14.5	13.9	13.8	14.6	13.82
McNeal	11.6	14.7	14.1	14.0	12.6	13.40
Newana	11.9	14.0	12.7	12.8	13.0	12.88
AC Crystal	11.9	12.9	12.7	12.2	13.4	12.62
Ivan	11.0	13.5	12.6	12.0	10.5	11.92
site average	13.16	15.31	14.71	14.06	14.34	
p value	0.000	0.000	0.000	0.000	0.017	
CV (S/Mean)	4.8	3.5	2.8	3.9	11.5	
CV(SE/Mean)	2.8	2.0	1.6	2.3	6.6	
LSD 0.05	1.0	0.9	0.7	0.9	2.7	
Planting date	23 Apr	28 Apr	1 May	1 May	17 Apr	
Harvest date	6 Aug	17 Aug	13 Aug	18 Aug	21 Jul	

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Table 5. Performance of spring wheat grown under dryland continuous cropping conditions at Circle, MT. Planted: 23 April 1998 Harvested: 6 August 1998 Cooperator: Victor Wagner

Variety	Height, inches	Test weight	Grain protein	Yield, bu/acre	\$/acre ¹ -/- McNeal
ND695	28	61.7	13.6	47.6	53.22
Amidon	32	61.5	12.5	44.6	25.26
Keene	33	61.8	13.7	38.3	10.56
ND694	32	62.1	13.6	37.7	6.59
Trenton	32	61.8	13.4	38.1	6.18
AC Barrie	32	61.2	15.0	35.4	4.96
Ernest	31	61.8	13.8	36.5	2.76
Hagar	27	61.5	12.8	38.6	1.95
McNeal	29	60.7	11.6	41.2	0.00
Scholar	30	61.2	14.0	35.3	-1.19
Grandin	29	62.0	14.2	35.0	-1.58
Stoa	31	61.2	13.6	35.7	-2.83
Verde	28	61.3	13.7	35.1	-4.61
Lew	33	61.7	12.3	38.2	-5.19
Kulm	29	62.5	14.6	33.6	-6.00
2398	27	62.0	13.1	35.2	-10.12
2375	28	61.5	12.8	35.5	-11.94
Nora	24	60.9	14.0	30.2	-25.72
Ivan	24	62.3	11.0	34.7	-32.87
MT9609	29	60.2	12.3	30.8	-37.31
Newana	27	61.2	11.9	30.6	-41.54
AC Crystal	28	61.5	11.9	37.3	**
Argent	30	62.8	14.0	36.8	**
MTHW9420	26	60.5	12.3	31.3	**
average	29.1	61.5	13.16	36.4	
p value	0.000	0.000	0.000	0.000	
CV (S/Mean)	4.0	0.8	4.8	8.0	
CV(SE/Mean)	2.3	0.5	2.8	4.6	
LSD 0.05	1.9	0.8	1.0	4.8	

¹Wheat 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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
ND695	--	--	--	--	47.6	47.6	115.5
Amidon	32.1	32.6	19.5	21.3	44.6	30.0	109.5
Keene	--	--	17.0	24.1	38.3	26.5	104.7
McNeal	32.0	29.4	16.2	18.4	41.2	27.4	100.0
Scholar	--	--	--	23.6	35.3	29.5	98.8
Ernest	30.8	28.6	17.7	19.9	36.5	26.7	97.4
2375	35.1	28.6	15.0	18.6	35.5	26.6	97.1
Lew	33.1	28.5	16.0	17.3	38.2	26.6	97.0
Trenton	--	25.7	19.0	18.0	38.1	25.2	95.8
Stoa	29.5	30.5	17.4	--	35.7	28.3	95.2
Hagar	--	--	--	--	38.6	38.6	93.7
2398	--	--	17.4	17.6	35.2	23.4	92.6
Verde	--	--	--	20.1	35.1	27.6	92.6
AC Barrie	--	--	--	19.4	35.4	27.4	91.9
ND694	--	--	--	--	37.7	37.7	91.5
AC Crystal	--	--	--	--	37.3	37.3	90.5
Argent	--	--	--	--	36.8	36.8	89.3
Kulm	30.2	23.6	16.1	18.3	33.6	24.4	89.1
Grandin	25.4	25.0	16.3	19.1	35.0	24.2	88.3
Ivan	--	--	--	--	34.7	34.7	84.2
Newana	27.8	26.8	14.6	15.2	30.6	23.0	83.9
MTHW9420	--	--	--	17.5	31.3	24.4	81.9
MT9609	--	--	--	--	30.8	30.8	74.8
Nora	--	--	--	--	30.2	30.2	73.3

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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
Kulm	64.2	64.0	63.2	65.4	62.5	63.9	103.9
Keene	--	--	63.2	63.5	61.8	62.8	103.5
Argent	--	--	--	--	62.8	62.8	103.5
Grandin	63.8	64.5	62.7	65.2	62.0	63.6	103.4
Trenton	--	64.3	62.1	65.3	61.8	63.4	103.3
Verde	--	--	--	64.6	61.3	63.0	103.3
Ernest	64.2	63.2	63.0	64.4	61.8	63.3	102.9
2398	--	--	61.8	63.7	62.0	62.5	102.9
Newana	63.9	64.1	62.8	63.7	61.2	63.1	102.6
Ivan	--	--	--	--	62.3	62.3	102.6
MTHW9420	--	--	--	64.4	60.5	62.5	102.5
Scholar	--	--	--	63.6	61.2	62.4	102.4
Lew	62.9	63.8	62.4	63.8	61.7	62.9	102.3
2375	63.8	63.8	61.6	63.9	61.5	62.9	102.3
AC Barrie	--	--	--	63.5	61.2	62.4	102.3
ND694	--	--	--	--	62.1	62.1	102.3
Amidon	62.5	63.8	62.4	63.2	61.5	62.7	102.0
ND695	--	--	--	--	61.7	61.7	101.6
Hagar	--	--	--	--	61.5	61.5	101.3
AC Crystal	--	--	--	--	61.5	61.5	101.3
Stoa	62.8	62.9	62.1	--	61.2	62.2	101.0
Nora	--	--	--	--	60.9	60.9	100.3
McNeal	62.2	63.3	60.3	61.2	60.7	61.5	100.0
MT9609	--	--	--	--	60.2	60.2	99.2

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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
Argent	--	--	--	--	14.0	14.00	120.7
Nora	--	--	--	--	14.0	14.00	120.7
AC Barrie	--	--	--	14.6	15.0	14.80	117.9
ND695	--	--	--	--	13.6	13.60	117.2
ND694	--	--	--	--	13.6	13.60	117.2
Scholar	--	--	--	13.7	14.0	13.82	110.4
Hagar	--	--	--	--	12.8	12.80	110.3
Verde	--	--	--	13.8	13.7	13.75	109.6
Kulm	11.7	14.0	13.2	13.5	14.6	13.40	107.9
Keene	--	--	13.1	13.7	13.7	13.50	106.0
MT9609	--	--	--	--	12.3	12.30	106.0
Ernest	10.8	14.0	12.8	14.0	13.8	13.08	105.3
2398	--	--	12.9	13.8	13.1	13.27	104.2
MTHW9420	--	--	--	13.8	12.3	13.05	104.0
Grandin	10.3	13.3	12.6	13.8	14.2	12.84	103.4
Trenton	--	13.5	13.6	13.0	13.4	13.38	102.9
AC Crystal	--	--	--	--	11.9	11.90	102.6
Stoa	10.0	13.4	12.6	--	13.6	12.40	102.1
McNeal	10.1	13.8	13.1	13.5	11.6	12.42	100.0
Lew	10.0	12.9	12.5	13.4	12.3	12.22	98.4
Amidon	10.7	12.8	11.6	13.5	12.5	12.22	98.4
2375	9.8	12.7	12.1	13.6	12.8	12.20	98.2
Newana	9.9	13.1	12.6	12.8	11.9	12.06	97.1
Ivan	--	--	--	--	11.0	11.00	94.8

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 9. Performance of spring wheat grown under dryland conditions at Wibaux, MT.
 Planted: 28 April 1998 Harvested: 17 August 1998
 Cooperator: David Maus

Variety	Height, inches	Test weight	Grain protein	Yield, bu/acre	\$/acre ¹ +/- McNeal
ND695	33	60.5	16.6	59.8	19.72
2398	30	60.2	15.3	58.2	11.76
Hagar	29	59.7	14.7	58.7	11.31
Verde	31	60.8	14.5	58.3	7.60
McNeal	32	59.8	14.7	56.4	0.00
ND694	36	61.0	16.8	55.3	-2.65
Newana	31	59.2	14.0	57.1	-2.84
Ivan	30	61.2	13.5	57.7	-7.45
Grandin	33	58.7	16.3	53.4	-12.09
AC Barrie	39	60.7	16.9	53.4	-12.09
Keene	38	61.8	15.6	52.2	-18.06
Lew	40	61.3	14.9	52.0	-20.09
Amidon	37	59.7	15.3	51.4	-22.03
Scholar	36	59.8	16.1	51.0	-24.02
Nora	26	59.7	15.4	50.4	-27.00
Kulm	35	61.5	15.2	50.4	-27.00
Trenton	39	59.8	16.1	50.4	-27.00
Stoa	38	59.8	15.4	49.8	-29.98
Ernest	36	60.3	15.5	49.5	-31.47
2375	32	59.8	15.6	48.0	-38.93
MT9609	35	59.0	15.1	45.7	-50.36
AC Crystal	30	60.5	12.9	59.1	**
Argent	33	61.2	16.6	54.1	**
MTHW9420	29	57.3	14.5	52.6	**
average	33.7	60.1	15.31	53.6	
p value	0.000	0.011	0.000	0.099	
CV (S/Mean)	4.0	2.0	3.5	10.2	
CV(SE/Mean)	2.3	1.1	2.0	5.9	
LSD 0.05	2.2	1.9	0.9	8.9	

¹Wheat 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 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	1993	1995	1996	1997	1998	Ave	as % of McNeal
Verde	--	--	--	46.2	58.3	52.2	106.9
ND695	--	--	--	--	59.8	59.8	106.0
AC Crystal	--	--	--	--	59.1	59.1	104.8
Hagar	--	--	--	--	58.7	58.7	104.1
2398	--	--	37.5	45.2	58.2	47.0	103.6
Ivan	--	--	--	--	57.7	57.7	102.3
McNeal	44.3	32.8	38.2	41.4	56.4	42.6	100.0
ND694	--	--	--	--	55.3	55.3	98.0
AC Barrie	--	--	--	42.0	53.4	47.7	97.5
Scholar	--	--	--	43.5	51.0	47.2	96.6
Argent	--	--	--	--	54.1	54.1	95.9
Keene	--	--	30.5	44.2	52.2	42.3	93.3
Trenton	--	30.8	33.6	42.4	50.4	39.3	92.3
MTHW9420	--	--	--	37.1	52.6	44.8	91.7
Amidon	33.2	28.6	33.4	44.4	51.4	38.2	89.7
Nora	--	--	--	--	50.4	50.4	89.4
2375	40.5	27.2	36.5	37.1	48.0	37.9	89.0
Stoa	33.9	33.7	34.9	--	49.8	38.1	88.7
Kulm	--	31.0	31.5	36.5	50.4	37.4	88.5
Ernest	--	27.8	37.0	34.5	49.5	37.2	88.2
Newana	30.1	25.8	29.4	43.8	57.1	37.2	87.3
Grandin	33.9	24.1	29.8	41.9	53.4	36.6	85.9
Lew	36.5	26.1	30.6	37.6	52.0	36.6	85.8
MT9609	--	--	--	--	45.7	45.7	81.0

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 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	1993	1995	1996	1997	1998	Ave	as % of McNeal
Keene	--	--	62.8	61.5	61.8	62.0	103.8
Kulm	--	63.2	63.0	62.0	61.5	62.4	103.7
Lew	62.8	62.2	62.7	61.2	61.3	62.0	102.6
Ivan	--	--	--	--	61.2	61.2	102.3
Argent	--	--	--	--	61.2	61.2	102.3
Verde	--	--	--	60.2	60.8	60.5	102.1
ND694	--	--	--	--	61.0	61.0	102.0
Trenton	--	62.9	62.5	60.3	59.8	61.4	101.9
Scholar	--	--	--	60.8	59.8	60.3	101.8
2398	--	--	61.7	60.5	60.2	60.8	101.7
Amidon	63.0	62.1	61.5	60.0	59.7	61.3	101.5
AC Barrie	--	--	--	59.5	60.7	60.1	101.4
Grandin	62.3	62.7	61.8	60.5	58.7	61.2	101.3
ND695	--	--	--	--	60.5	60.5	101.2
AC Crystal	--	--	--	--	60.5	60.5	101.2
Newana	61.5	62.6	62.7	59.7	59.2	61.1	101.1
2375	61.3	61.8	61.7	60.8	59.8	61.1	101.1
Ernest	--	61.4	62.0	59.8	60.3	60.9	101.1
McNeal	61.2	61.6	60.8	58.7	59.8	60.4	100.0
Stoa	60.5	61.6	61.0	--	59.8	60.7	99.8
Hagar	--	--	--	--	59.7	59.7	99.8
Nora	--	--	--	--	59.7	59.7	99.8
MT9609	--	--	--	--	59.0	59.0	98.7
MFHW9420	--	--	--	58.8	57.3	58.0	98.0

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 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	1993	1995	1996	1997	1998	Ave	as % of McNeal
ND694	--	--	--	--	16.8	16.80	114.3
ND695	--	--	--	--	16.6	16.60	112.9
Argent	--	--	--	--	16.6	16.60	112.9
AC Barrie	--	--	--	14.1	16.9	15.50	107.6
Scholar	--	--	--	14.4	16.1	15.25	105.9
Nora	--	--	--	--	15.4	15.40	104.8
Grandin	12.8	12.5	12.2	14.3	16.3	13.62	104.1
Ernest	--	13.0	12.0	14.6	15.5	13.78	103.2
MT9609	--	--	--	--	15.1	15.10	102.7
2375	12.6	12.2	11.8	14.4	15.6	13.32	101.8
Trenton	--	11.8	12.1	14.2	16.1	13.55	101.5
Kulm	--	12.4	12.0	14.6	15.2	13.55	101.5
Lew	12.2	13.1	12.6	13.3	14.9	13.22	101.1
2398	--	--	12.2	14.1	15.3	13.87	100.7
Stoa	11.8	11.9	12.4	--	15.4	12.88	100.4
Amidon	11.6	12.8	11.7	14.2	15.3	13.12	100.3
McNeal	12.0	12.1	12.5	14.1	14.7	13.08	100.0
Hagar	--	--	--	--	14.7	14.70	100.0
Keene	--	--	12.3	13.2	15.6	13.70	99.5
MTHW9420	--	--	--	13.6	14.5	14.05	97.6
Verde	--	--	--	12.4	14.5	13.45	93.4
Newana	11.0	11.3	11.6	13.1	14.0	12.20	93.3
Ivan	--	--	--	--	13.5	13.50	91.8
AC Crystal	--	--	--	--	12.9	12.90	87.8

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: 1 May 1998 Harvested: 13 August 1998 Cooperator: Mark Swank

Variety	Height, inches	Test weight	Grain protein	Yield, bu/acre	\$/acre ¹ -/- McNeal
ND695	28	63.0	15.4	50.7	12.41
Grandin	30	62.2	15.4	48.3	0.48
McNeal	29	61.3	14.1	49.6	0.00
Scholar	34	62.3	15.2	48.1	-0.51
Ernest	33	63.0	15.0	46.8	-6.97
Amidon	34	61.7	13.4	49.7	-8.47
2398	30	62.0	14.9	46.5	-9.39
Keene	33	63.0	15.8	45.8	-11.94
Trenton	33	62.3	15.4	45.8	-11.94
Hagar	27	62.2	15.2	45.8	-11.94
Stoa	33	60.7	14.9	44.3	-20.29
Verde	30	61.3	14.5	44.4	-22.45
Kulm	31	62.8	15.0	43.3	-24.37
Lew	34	62.7	14.2	44.2	-25.64
Newana	30	60.7	12.7	45.8	-35.30
Nora	27	61.5	14.6	40.8	-39.24
ND694	30	62.8	16.8	40.0	-40.77
AC Barrie	33	61.0	16.7	39.2	-44.75
MT9609	31	61.5	13.9	40.4	-46.05
2375	28	61.7	14.8	39.1	-46.42
Ivan	27	62.0	12.6	42.1	-53.07
AC Crystal	31	62.3	12.7	50.3	**
Argent	31	62.8	16.1	46.0	**
MTHW9420	29	61.0	13.9	39.3	**
average	30.8	62.0	14.71	44.8	
p value	0.000	0.000	0.000	0.005	
CV (S/Mean)	6.1	0.9	2.8	9.1	
CV(SE/Mean)	3.5	0.5	1.6	5.3	
LSD 0.05	3.1	0.9	0.7	6.7	

¹Wheat 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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
ND695	--	--	--	--	50.7	50.7	102.2
Amidon	52.5	37.2	25.8	26.5	49.7	38.3	101.4
AC Crystal	--	--	--	--	50.3	50.3	101.4
McNeal	50.9	38.1	24.7	25.8	49.6	37.8	100.0
Scholar	--	--	--	25.5	48.1	36.8	97.6
2398	--	--	22.7	27.1	46.5	32.1	96.2
Keene	--	--	23.5	26.1	45.8	31.8	95.3
Argent	--	--	--	--	46.0	46.0	92.7
Hagar	--	--	--	--	45.8	45.8	92.3
2375	55.1	30.1	25.9	23.3	39.1	34.7	91.8
Grandin	46.2	33.8	21.9	23.1	48.3	34.7	91.6
Stoa	46.8	34.1	24.0	--	44.3	37.3	91.4
Newana	49.2	33.5	20.3	22.3	45.8	34.2	90.5
Ernest	45.5	34.0	23.4	21.2	46.8	34.2	90.4
Verde	--	--	--	23.0	44.4	33.7	89.4
Trenton	--	31.3	23.0	22.8	45.8	30.7	88.9
Lew	46.3	32.8	19.5	22.0	44.2	33.0	87.1
Kulm	45.4	32.4	22.8	19.6	43.3	32.7	86.5
AC Barrie	--	--	--	25.8	39.2	32.5	86.2
Ivan	--	--	--	--	42.1	42.1	84.9
Nora	--	--	--	--	40.8	40.8	82.3
MT9609	--	--	--	--	40.4	40.4	81.5
ND694	--	--	--	--	40.0	40.0	80.6
MTHW9420	--	--	--	18.3	39.3	28.8	76.4

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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
Kulm	63.2	62.1	62.7	64.7	62.8	63.1	104.3
ND695	--	--	--	--	63.0	63.0	102.8
Ernest	63.4	59.0	61.3	63.3	63.0	62.0	102.5
MTHW9420	--	--	--	64.2	61.0	62.6	102.5
Scholar	--	--	--	62.8	62.3	62.6	102.5
Argent	--	--	--	--	62.8	62.8	102.4
ND694	--	--	--	--	62.8	62.8	102.4
Lew	62.5	59.9	59.5	64.0	62.7	61.7	102.0
Keene	--	--	60.7	62.3	63.0	62.0	102.0
AC Crystal	--	--	--	--	62.3	62.3	101.6
2375	62.4	59.0	60.8	63.3	61.7	61.4	101.5
Grandin	61.6	58.3	60.9	64.1	62.2	61.4	101.5
Hagar	--	--	--	--	62.2	62.2	101.5
Trenton	--	57.9	61.2	63.0	62.3	61.1	101.3
Verde	--	--	--	62.3	61.3	61.8	101.2
Ivan	--	--	--	--	62.0	62.0	101.1
Newana	60.9	58.5	60.3	64.7	60.7	61.0	100.8
2398	--	--	59.8	61.8	62.0	61.2	100.7
Amidon	62.0	58.5	60.3	62.0	61.7	60.9	100.7
Nora	--	--	--	--	61.5	61.5	100.3
MT9609	--	--	--	--	61.5	61.5	100.3
AC Barrie	--	--	--	61.2	61.0	61.1	100.1
McNeal	61.2	58.8	60.3	60.8	61.3	60.5	100.0
Stoa	60.9	57.2	60.2	--	60.7	59.8	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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
ND694	--	--	--	--	16.8	16.80	119.1
Argent	--	--	--	--	16.1	16.10	114.2
ND695	--	--	--	--	15.4	15.40	109.2
AC Barrie	--	--	--	15.5	16.7	16.10	108.1
Hagar	--	--	--	--	15.2	15.20	107.8
Nora	--	--	--	--	14.6	14.60	103.5
Keene	--	--	14.5	15.2	15.8	15.17	103.4
Kulm	12.5	15.1	14.2	16.1	15.0	14.58	103.3
Trenton	--	15.4	14.3	15.4	15.4	15.13	102.0
Scholar	--	--	--	15.2	15.2	15.20	102.0
Grandin	11.7	15.1	14.1	15.5	15.4	14.36	101.7
Ernest	12.1	15.0	14.0	15.6	15.0	14.34	101.6
Stoa	12.1	15.3	13.5	--	14.9	13.95	101.6
2398	--	--	15.2	14.5	14.9	14.87	101.4
Lew	11.9	14.9	14.8	15.0	14.2	14.16	100.3
McNeal	11.3	15.3	14.2	15.7	14.1	14.12	100.0
2375	11.6	14.8	13.7	15.0	14.8	13.98	99.0
MT9609	--	--	--	--	13.9	13.90	98.6
Verde	--	--	--	14.8	14.5	14.65	98.3
MTHW9420	--	--	--	15.0	13.9	14.45	97.0
Amidon	11.4	14.5	13.4	14.6	13.4	13.46	95.3
Newana	11.2	14.1	13.5	14.8	12.7	13.26	93.9
AC Crystal	--	--	--	--	12.7	12.70	90.1
Ivan	--	--	--	--	12.6	12.60	89.4

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

Table 17. Performance of spring wheat grown under dryland conditions at Reserve, MT.
 Planted: 1 May 1998 Harvested: 18 August 1998 Cooperator: Max Aasheim

Variety	Height, inches	Test weight	Grain protein	Yield, bu/acre	\$/acre ¹ +/- McNeal
ND695	30	60.7	14.6	50.6	40.66
2398	30	61.0	13.7	49.0	24.47
Scholar	33	61.5	14.6	46.2	19.05
Hagar	28	62.0	14.3	45.8	14.80
Verde	29	61.2	13.2	47.0	8.41
McNeal	30	61.2	14.0	43.2	0.00
Stoa	32	60.5	14.0	42.8	-1.92
Ivan	27	62.5	12.0	47.8	-4.16
Keene	33	62.7	14.7	41.1	-5.58
Trenton	35	60.7	14.3	41.0	-8.53
AC Barrie	32	60.3	14.8	38.8	-16.12
Nora	25	61.0	14.5	38.7	-18.55
Amidon	34	60.2	13.3	40.4	-21.14
Newana	28	60.3	12.8	41.3	-22.77
ND694	32	62.3	15.6	36.9	-24.40
Ernest	33	61.2	14.8	37.0	-25.01
Grandin	29	59.8	14.7	37.0	-25.75
Lew	34	62.0	14.1	36.6	-31.01
2375	30	60.3	13.9	36.1	-34.87
Kulm	29	62.0	14.5	34.8	-37.62
MT9609	32	59.5	14.2	27.6	-74.21
AC Crystal	31	61.2	12.2	47.2	**
MTHW9420	27	58.7	13.8	39.4	**
Argent	28	61.5	14.7	37.2	**
average	30.5	61.0	14.06	41.0	
p value	0.000	0.000	0.000	0.000	
CV (S/Mean)	5.0	0.9	3.9	9.2	
CV(SE/Mean)	2.9	0.5	2.3	5.3	
LSD _{0.05}	2.5	0.9	0.9	6.2	

¹Wheat 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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
ND695	--	--	--	--	50.6	50.6	117.1
Ivan	--	--	--	--	47.8	47.8	110.6
AC Crystal	--	--	--	--	47.2	47.2	109.3
Hagar	--	--	--	--	45.8	45.8	106.0
Verde	--	--	--	33.0	47.0	40.0	104.7
Scholar	--	--	--	33.6	46.2	39.9	104.5
McNeal	58.2	29.9	45.8	33.2	43.2	42.1	100.0
2398	--	--	36.6	33.5	49.0	39.7	97.5
Stoa	57.6	24.8	40.8	--	42.8	41.5	93.7
Keene	--	--	41.8	30.0	41.1	37.6	92.4
Amidon	54.0	28.5	39.2	31.4	40.4	38.7	91.9
Trenton	--	26.5	40.0	29.4	41.0	34.2	90.0
AC Barrie	--	--	--	29.7	38.8	34.2	89.7
Nora	--	--	--	--	38.7	38.7	89.6
Newana	51.4	27.0	43.0	25.5	41.3	37.6	89.3
2375	58.0	26.3	37.4	29.4	36.1	37.4	88.8
Ernest	52.2	26.2	43.2	26.4	37.0	37.0	87.9
Argent	--	--	--	--	37.2	37.2	86.1
ND694	--	--	--	--	36.9	36.9	85.4
Lew	51.4	26.6	37.9	26.9	36.6	35.9	85.3
Kulm	51.1	24.2	35.4	28.2	34.8	34.7	82.4
Grandin	49.0	23.6	35.7	26.8	37.0	34.4	81.8
MTHW9420	--	--	--	19.2	39.4	29.3	76.7
MT9609	--	--	--	--	27.6	27.6	63.9

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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
Kulm	63.4	63.0	64.5	61.7	62.0	62.9	102.6
Ivan	--	--	--	--	62.5	62.5	102.1
Keene	--	--	64.0	61.0	62.7	62.6	101.9
ND694	--	--	--	--	62.3	62.3	101.8
Hagar	--	--	--	--	62.0	62.0	101.3
Scholar	--	--	--	61.0	61.5	61.2	101.1
Lew	60.0	63.1	64.2	60.5	62.0	62.0	101.0
Ernest	62.2	60.7	63.8	61.4	61.2	61.9	100.9
Grandin	60.5	62.7	64.3	61.6	59.8	61.8	100.8
Verde	--	--	--	60.7	61.2	61.0	100.6
Trenton	--	61.4	64.3	61.2	60.7	61.9	100.6
Argent	--	--	--	--	61.5	61.5	100.5
2398	--	--	64.2	59.7	61.0	61.6	100.4
Newana	59.1	62.0	63.8	61.7	60.3	61.4	100.1
McNeal	60.5	61.9	63.0	60.0	61.2	61.3	100.0
2375	61.8	60.6	64.0	60.0	60.3	61.3	100.0
AC Crystal	--	--	--	--	61.2	61.2	100.0
Nora	--	--	--	--	61.0	61.0	99.7
Amidon	59.9	61.7	63.7	60.0	60.2	61.1	99.6
Stoa	60.0	61.3	63.2	--	60.5	61.2	99.4
AC Barrie	--	--	--	60.2	60.3	60.2	99.4
ND695	--	--	--	--	60.7	60.7	99.2
MTHW9420	--	--	--	60.6	58.7	59.6	98.4
MT9609	--	--	--	--	59.5	59.5	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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
ND694	--	--	--	--	15.8	15.80	112.9
AC Barrie	--	--	--	14.8	14.8	14.80	106.5
Scholar	--	--	--	14.6	14.6	14.60	105.0
Argent	--	--	--	--	14.7	14.70	105.0
Kulm	13.5	10.8	14.1	14.8	14.5	13.54	104.3
Ernest	13.9	10.4	14.4	14.2	14.8	13.54	104.3
ND695	--	--	--	--	14.6	14.60	104.3
Nora	--	--	--	--	14.5	14.50	103.6
Hagar	--	--	--	--	14.3	14.30	102.1
Keene	--	--	13.4	14.4	14.7	14.17	101.9
Grandin	12.2	10.3	14.0	14.7	14.7	13.18	101.5
MT9609	--	--	--	--	14.2	14.20	101.4
Stoa	14.2	10.0	13.4	--	14.0	12.90	101.0
Lew	13.9	10.3	13.3	13.5	14.1	13.02	100.3
2398	--	--	14.1	14.0	13.7	13.93	100.2
McNeal	12.8	10.4	13.9	13.8	14.0	12.98	100.0
Amidon	14.0	10.0	14.0	13.6	13.3	12.98	100.0
Trenton	--	10.1	13.5	14.2	14.3	13.03	100.0
MTHW9420	--	--	--	13.9	13.8	13.85	99.6
2375	12.4	10.2	14.2	13.2	13.9	12.78	98.5
Verde	--	--	--	13.6	13.2	13.40	96.4
Newana	12.8	9.8	13.0	13.4	12.8	12.36	95.2
AC Crystal	--	--	--	--	12.2	12.20	87.1
Ivan	--	--	--	--	12.0	12.00	85.7

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: 17 April 1998, Harvested: 31 July 1998 Cooperator: Bill Lauckner

Variety	Height, inches	Test weight	Grain protein	Yield, bu/acre	\$/acre ¹ +/- McNeal
McNeal	29	62.5	12.6	55.8	0.00
Lew	29	63.7	14.1	55.4	20.39
Newana	27	63.3	13.0	54.9	2.06
Hagar	27	63.5	13.9	53.8	10.51
Scholar	29	63.3	13.8	52.1	0.81
Ivan	25	63.8	10.5	50.8	-52.07
ND695	29	64.3	13.5	49.5	-15.53
Amidon	30	63.0	14.7	48.4	-9.06
Tioga	31	62.5	12.9	47.8	-31.61
Pasqua	34	62.8	13.1	47.2	-31.49
Nora	25	63.7	13.5	46.3	-30.51
2398	25	63.3	14.7	45.7	-22.35
Keene	31	64.0	14.9	45.6	-21.47
AC Barrie	29	62.8	16.1	45.4	-21.55
MT9609	28	62.8	14.8	44.8	-25.88
ND694	29	64.2	15.4	44.7	-25.03
Trenton	32	63.8	15.3	43.9	-29.01
2375	24	63.5	16.0	43.8	-29.50
Stoa	30	63.3	14.5	43.6	-33.99
Grandin	29	64.0	15.9	43.0	-33.48
Ernest	28	64.0	15.7	39.4	-51.37
Verde	28	62.5	15.8	39.0	-53.56
Kulm	27	64.0	16.8	38.2	-57.34
MTHW9420	23	63.5	14.6	54.2	**
AC Crystal	27	63.8	13.4	49.4	**
Argent	31	64.2	14.6	41.8	**
Kyle (durum)	33	64.0	14.0	48.9	
Wapiti (triticale)	33	63.3	13.6	43.3	
average	28.7	63.5	14.34	47.0	
p value	0.000	0.000	0.017	0.000	
CV (S/Mean)	5.7	0.7	11.5	9.2	
CV(SE/Mean)	3.3	0.4	6.6	5.3	
LSD 0.05	2.7	0.7	2.7	7.1	

¹Wheat 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. 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
McNeal	60.0	44.0	34.4	38.5	55.8	46.5	100.0
Hagar	--	--	--	--	53.8	53.8	96.4
Scholar	--	--	--	36.8	52.1	44.5	94.3
Newana	61.3	30.7	37.0	34.3	54.9	43.6	93.8
Amidon	51.4	43.7	33.8	38.7	48.4	43.2	92.9
2398	--	--	36.5	35.8	45.7	39.3	91.7
Ivan	--	--	--	--	50.8	50.8	91.0
MTHW9420	--	--	--	30.9	54.2	42.6	90.2
Keene	--	--	35.1	34.0	45.6	38.2	89.1
Lew	54.8	32.0	31.9	32.3	55.4	41.3	88.8
ND695	--	--	--	--	49.5	49.5	88.7
AC Crystal	--	--	--	--	49.4	49.4	88.5
Stoa	56.0	40.6	30.6	--	43.6	42.7	88.0
Kyle (durum)	--	--	--	--	48.9	48.9	87.6
Grandin	45.9	42.4	32.9	39.4	43.0	40.7	87.5
Pasqua	--	--	--	--	47.2	47.2	84.6
Tioga	53.1	36.4	30.7	28.7	47.8	39.3	84.5
Trenton	--	32.9	34.5	34.4	43.9	36.4	84.4
2375	52.4	31.4	37.4	28.0	43.8	38.6	83.0
Nora	--	--	--	--	46.3	46.3	83.0
Kulm	52.8	38.3	31.5	31.1	38.2	38.4	82.6
AC Barrie	--	--	--	32.3	45.4	38.9	82.4
Ernest	52.8	37.4	31.0	28.3	39.4	37.8	81.3
MT9609	--	--	--	--	44.8	44.8	80.3
ND694	--	--	--	--	44.7	44.7	80.1
Wapiti (triticale)	--	--	--	--	43.3	43.3	77.6
Argent	--	--	--	--	41.8	41.8	74.9
Verde	--	--	--	25.9	39.0	32.5	68.8

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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
Kulm	63.8	61.2	62.8	60.0	64.0	62.4	104.3
ND695	--	--	--	--	64.3	64.3	102.9
Ernest	63.2	59.9	62.2	58.3	64.0	61.5	102.8
Lew	61.9	60.8	61.8	59.3	63.7	61.5	102.8
Keene	--	--	63.0	59.0	64.0	62.0	102.8
ND694	--	--	--	--	64.2	64.2	102.7
Argent	--	--	--	--	64.2	64.2	102.7
Kyle (durum)	--	--	--	--	64.0	64.0	102.4
Amidon	62.1	60.8	61.3	58.3	63.0	61.1	102.2
Ivan	--	--	--	--	63.8	63.8	102.1
AC Crystal	--	--	--	--	63.8	63.8	102.1
Nora	--	--	--	--	63.7	63.7	101.9
2375	60.6	60.0	61.5	58.8	63.5	60.9	101.8
Grandin	60.2	58.6	61.7	59.3	64.0	60.8	101.7
Trenton	--	59.9	61.2	59.5	63.8	61.1	101.6
Hagar	--	--	--	--	63.5	63.5	101.6
Newana	59.6	58.6	62.0	59.3	63.3	60.6	101.3
Tioga	61.5	59.0	61.8	58.2	62.5	60.6	101.3
Scholar	--	--	--	59.0	63.3	61.2	101.3
Wapiti (triticale)	--	--	--	--	63.3	63.3	101.3
2398	--	--	61.5	58.2	63.3	61.0	101.1
MTHW9420	--	--	--	58.5	63.5	61.0	101.1
Stoa	59.7	58.8	61.2	--	63.3	60.8	101.0
AC Barrie	--	--	--	58.8	62.8	60.8	100.7
Pasqua	--	--	--	--	62.8	62.8	100.5
MT9609	--	--	--	--	62.8	62.8	100.5
Verde	--	--	--	58.7	62.5	60.6	100.4
McNeal	58.3	59.6	60.3	58.2	62.5	59.8	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 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
ND694	--	--	--	--	15.4	15.40	122.2
MT9609	--	--	--	--	14.8	14.80	117.5
Argent	--	--	--	--	14.6	14.60	115.9
Kyle (durum)	--	--	--	--	14.0	14.00	111.1
AC Barrie	--	--	--	16.0	16.1	16.05	110.7
Hagar	--	--	--	--	13.9	13.90	110.3
Wapiti (triticale)	--	--	--	--	13.6	13.60	107.9
ND695	--	--	--	--	13.5	13.50	107.1
Nora	--	--	--	--	13.5	13.50	107.1
AC Crystal	--	--	--	--	13.4	13.40	106.3
Kulm	14.5	14.5	14.7	16.9	16.8	15.48	105.9
Verde	--	--	--	14.9	15.8	15.35	105.9
2398	--	--	14.6	15.8	14.7	15.03	104.2
Scholar	--	--	--	16.4	13.8	15.10	104.1
Pasqua	--	--	--	--	13.1	13.10	104.0
MTHW9420	--	--	--	15.5	14.6	15.05	103.8
Trenton	--	14.8	14.6	15.2	15.3	14.98	103.1
Grandin	14.8	14.5	14.7	15.3	15.9	15.04	102.9
Ernest	14.7	14.8	14.3	15.5	15.7	15.00	102.6
Stoa	14.9	15.1	13.7	--	14.5	14.55	102.6
Keene	--	--	12.8	16.1	14.9	14.60	101.2
2375	13.7	14.5	13.6	15.8	16.0	14.72	100.7
McNeal	15.0	14.8	14.3	16.4	12.6	14.62	100.0
Tioga	14.2	15.6	13.3	16.0	12.9	14.40	98.5
Amidon	14.2	14.2	13.8	14.6	14.7	14.30	97.8
Lew	13.8	15.0	13.0	14.4	14.1	14.06	96.2
Newana	13.9	14.2	12.7	14.8	13.0	13.72	93.8
Iyan	--	--	--	--	10.5	10.50	83.3

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

Table 25. Summary of spring wheat yields in bu/acre at three irrigated off-station sites in eastern Montana, 1998. All sites are under pivot irrigation.

Variety	Scobey	Dagmar	Larslan	average
ND695	60.6	78.4	71.8	70.3
AC Crystal	67.1	76.5	63.1	68.9
Hagar	57.2	75.3	72.2	68.2
Ivan	57.0	70.4	72.4	66.6
ND694	60.3	69.9	68.6	66.3
AC Barrie	59.4	69.8	68.4	65.9
Verde	54.2	73.3	69.6	65.7
2375	57.8	74.4	63.6	65.3
2398	60.0	70.9	64.4	65.1
Ernest	57.2	67.2	63.8	62.7
Keene	58.8	67.1	62.1	62.7
Grandin	53.5	66.5	67.5	62.5
Argent	51.4	71.4	64.3	62.4
McNeal	59.7	70.3	56.5	62.2
Trenton	50.5	69.1	63.8	61.1
Scholar	55.6	66.1	55.6	59.1
Amidon	57.3	63.7	54.8	58.6
Stoa	51.4	63.7	59.0	58.0
Kulm	48.0	58.4	60.2	55.5
Nora	46.4	55.4	55.2	52.3
Lew	50.4	57.1	48.3	51.9
MTHW9420	44.0	64.0	47.1	51.7
Newana	46.7	65.9	42.0	51.5
MT9609	35.1	59.8	45.0	46.6
site average	54.0	67.7	60.8	
p value	0.000	0.000	0.000	
CV (S/Mean)	8.0	7.6	9.8	
CV(SE/Mean)	4.6	4.4	5.7	
LSD _{0.05}	7.2	8.4	9.8	
Planting date	4 May	1 May	17 Apr	
Harvest date	26 Aug	18 Aug	25 Aug	

Cooperators:

County
 Sheridan Co
 Daniels Co
 Valley Co

Producer
 Steve Brekke
 Kenny Benson
 Kelly Donovan

CES Agent
 Terry Angvick
 Bobbie Roos
 Verlin Koenig

Table 26. Summary of spring wheat test weights as lb/bu at three irrigated off-station sites in eastern Montana, 1998. All sites are under pivot irrigation.

Variety	Scobey	Dagmar	Larslan	average
ND694	63.7	63.3	59.7	62.2
Keene	63.7	62.7	58.8	61.7
AC Barrie	62.7	62.8	59.2	61.6
Lew	63.8	62.7	58.2	61.6
Kulm	63.2	62.5	58.3	61.3
2375	63.0	62.8	57.2	61.0
Argent	62.5	62.8	57.5	60.9
ND695	62.5	62.0	57.8	60.8
2398	63.0	62.0	56.8	60.6
Trenton	61.8	62.0	57.7	60.5
Ernest	63.0	62.3	56.3	60.5
Ivan	61.3	61.8	57.8	60.3
McNeal	62.5	61.5	56.5	60.2
Grandin	62.2	61.8	56.2	60.1
Scholar	62.7	61.8	55.2	59.9
Hagar	61.2	61.7	56.3	59.7
Stoa	61.7	61.0	56.3	59.7
AC Crystal	62.5	61.3	54.7	59.5
MT9609	60.3	61.3	56.7	59.4
Nora	61.3	60.3	56.7	59.4
Amidon	62.3	60.7	54.7	59.2
Verde	60.7	60.8	55.2	58.9
Newana	61.0	61.0	54.2	58.7
MTHW9420	59.2	59.2	53.5	57.3
site average	62.2	61.8	56.7	
p value	0.000	0.000	0.000	
CV (S/Mean)	0.9	0.9	2.0	
CV(SE/Mean)	0.5	0.5	1.2	
LSD _{0.05}	1.0	1.0	1.9	
Planting date	4 May	1 May	17 Apr	
Harvest date	26 Aug	18 Aug	25 Aug	

Cooperators:

County

Sheridan Co

Daniels Co

Valley Co

Producer

Steve Brekke

Kenny Benson

Kelly Donovan

CES Agent

Terry Angvick

Bobbie Roos

Verlin Koenig

Table 27. Summary of spring wheat heights in inches at three irrigated off-station sites in eastern Montana, 1998. All sites are under pivot irrigation.

Variety	Scobey	Dagmar	Larslan	average
Trenton	40	38	39	39.0
Keene	39	39	38	38.7
Lew	39	37	38	38.0
AC Barrie	37	38	37	37.3
Amidon	38	37	35	36.7
ND694	36	37	36	36.3
Ernest	36	38	35	36.3
Stoa	36	38	35	36.3
MT9609	35	37	36	36.0
Scholar	36	35	36	35.7
Kulm	35	35	36	35.3
ND695	35	35	34	34.7
McNeal	35	34	35	34.7
Argent	35	35	33	34.3
2375	33	35	34	34.0
Grandin	33	33	34	33.3
Verde	32	33	34	33.0
2398	31	33	34	32.7
AC Crystal	32	33	31	32.0
Hagar	30	32	32	31.3
Ivan	30	31	33	31.3
Newana	30	31	31	30.7
MTHW9420	28	30	32	30.0
Nora	26	29	28	27.7
site average	33.9	34.7	34.4	
p value	0.000	0.000	0.000	
CV (S/Mean)	3.9	2.8	6.6	
CV(SE/Mean)	2.2	1.6	3.8	
LSD 0.05	2.2	1.6	3.7	
Planting date	4 May	1 May	17 Apr	
Harvest date	26 Aug	18 Aug	25 Aug	

Cooperators:

County
 Sheridan Co
 Daniels Co
 Valley Co

Producer
 Steve Brekke
 Kenny Benson
 Kelly Donovan

CES Agent
 Terry Angvick
 Bobbie Roos
 Verlin Koenig

Table 28. Summary of spring wheat grain protein contents as percent at three irrigated off-station sites in eastern Montana, 1998. All sites are under pivot irrigation.

Variety	Scobey	Dagmar	Larslan	average
AC Barrie	15.7	16.2	15.5	15.80
ND695	15.8	15.6	15.7	15.70
ND694	15.7	14.7	15.8	15.40
Trenton	15.1	15.9	15.1	15.37
Argent	14.8	15.6	14.9	15.10
Keene	15.4	14.8	15.0	15.07
Ernest	14.8	15.2	15.1	15.03
Kulm	14.6	14.6	15.6	14.93
Scholar	14.4	15.0	15.2	14.87
Nora	14.7	14.7	15.2	14.87
Grandin	14.2	15.4	14.7	14.77
Stoa	15.0	14.4	14.9	14.77
Lew	13.9	14.6	15.4	14.63
Hagar	13.8	14.2	14.6	14.20
Amidon	13.2	14.1	14.6	13.97
McNeal	13.7	13.3	14.6	13.87
2375	13.3	13.9	14.1	13.77
MT9609	13.2	13.9	14.1	13.73
2398	13.0	13.8	14.0	13.60
MTHW9420	13.3	13.0	14.4	13.57
Verde	12.8	13.7	13.8	13.43
Newana	12.6	13.1	14.3	13.33
Ivan	11.8	11.4	13.4	12.20
AC Crystal	11.5	12.0	12.8	12.10
site average	14.01	14.30	14.70	
p value	0.000	0.000	0.000	
CV (S/Mean)	2.0	2.2	1.9	
CV(SE/Mean)	1.2	1.3	1.1	
LSD _{0.05}	0.5	0.5	0.5	
Planting date	4 May	1 May	17 Apr	
Harvest date	26 Aug	18 Aug	25 Aug	

Cooperators:

County
 Sheridan Co
 Daniels Co
 Valley Co

Producer
 Steve Brekke
 Kenny Benson
 Kelly Donovan

CES Agent
 Terry Angvick
 Bobbie Roos
 Verlin Koenig

Table 29. Performance of spring wheat grown under irrigated conditions at Scobey, MT.
 Planted: 4 May 1998 Harvested: 26 August 1998 Cooperator: Kenny Benson

Variety	Height, inches	Test weight	Grain protein	Yield, bu/acre	\$/acre ¹ -/- McNeal
ND695	35	62.5	15.8	60.6	18.20
ND694	36	63.7	15.7	60.3	16.71
AC Barrie	37	62.7	15.7	59.4	12.24
Keene	39	63.7	15.4	58.8	9.26
McNeal	35	62.5	13.7	59.7	0.00
Ernest	36	63.0	14.8	57.2	-0.41
2398	31	63.0	13.0	60.0	-10.58
Hagar	30	61.2	13.8	57.2	-10.71
Scholar	36	62.7	14.4	55.6	-12.21
2375	33	63.0	13.3	57.8	-15.94
Amidon	38	62.3	13.2	57.3	-19.40
Grandin	33	62.2	14.2	53.5	-24.04
Stoa	36	61.7	15.0	51.4	-27.52
Trenton	40	61.8	15.1	50.5	-32.00
Verde	32	60.7	12.8	54.2	-40.16
Lew	39	63.8	13.9	50.4	-41.56
Ivan	30	61.3	11.8	57.0	-43.58
Kulm	35	63.2	14.6	48.0	-47.30
Nora	26	61.3	14.7	46.4	-54.69
Newana	30	61.0	12.6	46.7	-76.10
MT9609	35	60.3	13.2	35.1	-121.52
AC Crystal	32	62.5	11.5	67.1	**
Argent	35	62.5	14.8	51.4	**
MTHW9420	28	59.2	13.3	44.0	**
average	34.0	62.2	14.01	54.1	
p value	0.000	0.000	0.000	0.000	
CV (S/Mean)	3.9	0.9	2.0	8.0	
CV(SE/Mean)	2.2	0.5	1.2	4.6	
LSD 0.05	2.2	1.0	0.5	7.2	

¹Wheat 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 30. Relative yielding abilities of spring wheat varieties as compared to McNeal when grown under irrigated conditions in Daniels County in cooperation with CES.
Cooperator: Kenny Benson

Variety	1996	1997	1998	average	As % of McNeal
AC Crystal	--	--	67.1	67.1	112.4
2398	74.6	54.9	60.0	63.2	105.0
ND695	--	--	60.6	60.6	101.5
ND694	--	--	60.3	60.3	101.0
McNeal	68.6	52.3	59.7	60.2	100.0
Amidon	72.1	49.9	57.3	59.8	99.3
Scholar	--	53.4	55.6	54.5	97.3
AC Barrie	--	49.3	59.4	54.4	97.1
Ernest	61.2	56.2	57.2	58.2	96.7
Verde	--	54.0	54.2	54.1	96.6
Hagar	--	--	57.2	57.2	95.8
Ivan	--	--	57.0	57.0	95.5
2375	63.9	49.3	57.8	57.0	94.7
Keene	58.5	52.3	58.8	56.5	93.9
Grandin	62.9	45.0	53.5	53.8	89.4
Trenton	54.4	54.2	50.5	53.0	88.0
Argent	--	--	51.4	51.4	86.1
Stoa	57.1	--	51.4	54.2	84.6
Lew	61.8	40.3	50.4	50.8	84.4
Kulm	56.7	42.7	48.0	49.1	81.6
Newana	64.2	32.2	46.7	47.7	79.2
Nora	--	--	46.4	46.4	77.7
MTHW9420	--	34.8	44.0	39.4	70.4
MT9609	--	--	35.1	35.1	58.8

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 31. Relative test weights of spring wheat varieties as compared to McNeal when grown under irrigated conditions in Daniels County in cooperation with CES.

Cooperator: Kenny Benson

Variety	1996	1997	1998	average	As % of McNeal
Keene	64.5	61.7	63.7	63.3	102.1
ND694	--	--	63.7	63.7	101.8
Lew	64.3	60.5	63.8	62.9	101.5
Ernest	64.3	60.8	63.0	62.7	101.1
Kulm	64.0	61.0	63.2	62.7	101.1
Scholar	--	61.2	62.7	62.0	101.0
Grandin	64.0	61.0	62.2	62.4	100.6
Amidon	63.8	61.0	62.3	62.4	100.6
2398	64.0	60.2	63.0	62.4	100.6
Trenton	64.0	60.8	61.8	62.2	100.3
McNeal	63.2	60.2	62.5	62.0	100.0
2375	63.7	59.3	63.0	62.0	100.0
AC Crystal	--	--	62.5	62.5	100.0
ND695	--	--	62.5	62.5	100.0
Argent	--	--	62.5	62.5	100.0
Stoa	63.0	--	61.7	62.4	99.2
AC Barrie	--	58.8	62.7	60.8	99.0
Ivan	--	--	61.3	61.3	98.1
Nora	--	--	61.3	61.3	98.1
Hagar	--	--	61.2	61.2	97.9
Newana	63.5	57.3	61.0	60.6	97.7
Verde	--	59.0	60.7	59.9	97.6
MT9609	--	--	60.3	60.3	96.5
MTHW9420	--	57.8	59.2	58.5	95.4

NOTE: Average test weights 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 32. Relative protein contents of spring wheat varieties as compared to McNeal when grown under irrigated conditions in Daniels County in cooperation with CES.

Cooperator: Kenny Benson

Variety	1996	1997	1998	average	As % of McNeal
ND695	--	--	15.8	15.80	115.3
ND694	--	--	15.7	15.70	114.6
AC Barrie	--	14.3	15.7	15.00	109.1
Argent	--	--	14.8	14.80	108.0
Nora	--	--	14.7	14.70	107.3
Trenton	14.4	14.1	15.1	14.53	105.6
Kulm	14.9	14.1	14.6	14.53	105.6
Keene	14.4	13.8	15.4	14.53	105.6
Stoa	13.8	--	15.0	14.40	104.7
Ernest	14.1	14.0	14.8	14.30	103.9
Scholar	--	13.9	14.4	14.15	102.9
Grandin	14.2	13.9	14.2	14.10	102.4
Hagar	--	--	13.8	13.80	100.7
McNeal	13.8	13.8	13.7	13.77	100.0
Lew	13.9	13.3	13.9	13.70	99.5
Amidon	13.6	13.8	13.2	13.53	98.3
MTHW9420	--	13.4	13.3	13.35	97.1
2375	13.5	13.2	13.3	13.33	96.9
2398	13.4	13.5	13.0	13.30	96.6
MT9609	--	--	13.2	13.20	96.4
Newana	12.7	13.2	12.6	12.83	93.2
Verde	--	12.8	12.8	12.80	93.1
Ivan	--	--	11.8	11.80	86.1
AC Crystal	--	--	11.5	11.50	83.9

NOTE: Average proteins 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 33. Performance of spring wheat grown under irrigated conditions at Dagmar, MT.
 Planted: 1 May 1998 Harvested: 18 August 1998 Cooperator: Steve Brekke

Variety	Height, inches	Test weight	Grain protein	Yield, bu/acre	\$/acre ¹ +/- McNeal
ND695	35	62.0	15.6	78.4	64.86
Hagar	32	61.7	14.2	75.3	39.66
2375	35	62.8	13.9	74.4	31.59
Verde	33	60.8	13.7	73.3	22.65
AC Barrie	38	62.8	16.2	69.8	22.12
ND694	37	63.3	14.7	69.9	19.12
Trenton	38	62.0	15.9	69.1	18.64
2398	33	62.0	13.8	70.9	12.69
Ernest	38	62.3	15.2	67.2	9.19
Keene	39	62.7	14.8	67.1	6.68
Grandin	33	61.8	15.4	66.5	5.71
Scholar	35	61.8	15.0	66.1	3.73
McNeal	34	61.5	13.3	70.3	0.00
Stoa	38	61.0	14.4	63.7	-14.57
Amidon	37	60.7	14.1	63.7	-17.12
Newana	31	61.0	13.1	65.9	-23.63
Ivan	31	61.8	11.4	70.4	-36.85
Kulm	34	62.5	14.6	58.4	-38.05
MT9609	37	61.3	13.9	59.8	-38.35
Lew	37	62.7	14.6	57.1	-44.43
Nora	29	60.3	14.7	55.4	-52.22
AC Crystal	33	61.3	12.0	76.5	**
Argent	35	62.8	15.6	71.4	**
MTHW9420	30	59.2	13.0	64.0	**
average	34.7	61.8	14.30	67.7	
p value	0.000	0.000	0.000	0.000	
CV (S/Mean)	1.0	0.9	2.2	7.6	
CV(SE/Mean)	1.6	1.5	1.3	4.4	
LSD _{0.05}	1.6	1.0	0.5	8.4	

¹Wheat prices summarized by Gregg Carlson, NARC, Havre, MT, from average 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 34. Relative yields of spring wheat varieties as compared to Newana when grown under irrigated conditions in Sheridan County in cooperation with CES.

Cooperator: Steve Brekke

Cultivar	1991	1992	1993	1996	1998	Ave	as % of Newana
ND695	--	--	--	--	78.4	78.4	119.0
AC Crystal	--	--	--	--	76.5	76.5	116.1
2375	37.8	--	80.3	62.5	74.4	63.8	115.7
Hagar	--	--	--	--	75.3	75.3	114.3
Verde	--	--	--	--	73.3	73.3	111.2
Amidon	38.4	82.5	91.3	53.3	63.7	65.8	108.3
McNeal	--	93.9	79.5	48.6	70.3	73.1	108.3
Argent	--	--	--	--	71.4	71.4	108.3
Ivan	--	--	--	--	70.4	70.4	106.8
Keene	--	--	--	54.0	67.1	60.6	106.5
ND694	--	--	--	--	69.9	69.9	106.1
AC Barrie	--	--	--	--	69.8	69.8	105.9
Trenton	--	--	--	49.9	69.1	59.5	104.7
2398	--	--	--	46.6	70.9	58.8	103.3
Ernest	--	--	--	47.4	67.2	57.3	100.8
Stoa	37.6	--	--	47.5	63.7	55.6	100.6
Scholar	--	--	--	--	66.1	66.1	100.3
Newana	34.2	83.6	72.5	47.8	65.9	60.8	100.0
Grandin	38.8	--	69.9	38.8	66.5	53.5	97.1
MTHW9420	--	--	--	--	64.0	64.0	97.1
Lew	37.5	--	--	46.5	57.1	47.0	95.4
Kulm	--	--	--	45.6	58.4	52.0	91.5
MT9609	--	--	--	--	59.8	59.8	90.7
Nora	--	--	--	--	55.4	55.4	84.1

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

Table 35. Relative test weights of spring wheat varieties as compared to Newana when grown under irrigated conditions in Sheridan County in cooperation with CES.

Cooperator: Steve Brekke

Cultivar	1991	1992	1993	1996	1998	Ave	as % of Newana
ND694	--	--	--	--	63.3	63.3	103.8
Lew	59.9	--	--	63.7	62.7	62.1	103.6
Pioneer 2375	58.7	--	60.7	62.8	62.8	61.2	103.2
Argent	--	--	--	--	62.8	62.8	103.0
AC Barrie	--	--	--	--	62.8	62.8	103.0
Grandin	58.5	--	59.8	62.7	61.8	60.7	102.3
Kulm	--	--	--	64.0	62.5	63.2	101.8
ND695	--	--	--	--	62.0	62.0	101.6
Keene	--	--	--	63.3	62.7	63.0	101.4
Ivan	--	--	--	--	61.8	61.8	101.3
Scholar	--	--	--	--	61.8	61.8	101.3
Hagar	--	--	--	--	61.7	61.7	101.1
Ernest	--	--	--	63.2	62.3	62.8	101.0
McNeal	--	59.7	60.1	62.0	61.5	60.8	100.9
Amidon	57.1	59.0	59.5	62.8	60.7	59.8	100.8
Trenton	--	--	--	63.2	62.0	62.6	100.7
MT9609	--	--	--	--	61.3	61.3	100.5
AC Crystal	--	--	--	--	61.3	61.3	100.5
Stoa	58.3	--	--	61.0	61.0	60.1	100.3
Newana	55.5	59.3	57.6	63.3	61.0	59.3	100.0
Verde	--	--	--	--	60.8	60.8	99.7
Pioneer 2398	--	--	--	61.2	62.0	61.6	99.1
Nora	--	--	--	--	60.3	60.3	98.9
MTHW9420	--	--	--	--	59.2	59.2	97.0

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

Table 36. 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	1991	1992	1993	1996	1998	Ave	as % of Newana
AC Barrie	--	--	--	--	16.2	16.20	123.7
ND695	--	--	--	--	15.6	15.60	119.1
Argent	--	--	--	--	15.6	15.60	119.1
Scholar	--	--	--	--	15.0	15.00	114.5
ND694	--	--	--	--	14.7	14.70	112.2
Nora	--	--	--	--	14.7	14.70	112.2
Trenton	--	--	--	11.2	15.9	13.55	111.5
Hagar	--	--	--	--	14.2	14.20	108.4
Kulm	--	--	--	11.6	14.6	13.10	107.8
Ernest	--	--	--	10.9	15.2	13.05	107.4
Grandin	14.2	--	15.0	11.2	15.4	13.95	107.1
Lew	14.1	--	--	11.7	14.6	13.47	106.6
2398	--	--	--	12.0	13.8	12.90	106.2
Keene	--	--	--	11.0	14.8	12.90	106.2
Stoa	14.1	--	--	11.7	14.4	13.40	106.1
MT9609	--	--	--	--	13.9	13.90	106.1
Verde	--	--	--	--	13.7	13.70	104.6
Amidon	13.8	13.1	15.0	10.8	14.1	13.36	104.0
Newana	13.6	12.1	14.2	11.2	13.1	12.84	100.0
2375	12.8	--	14.1	11.1	13.9	12.98	99.6
MTHW9420	--	--	--	--	13.0	13.00	99.2
McNeal	--	10.8	14.8	11.0	13.3	12.48	98.6
AC Crystal	--	--	--	--	12.0	12.00	91.6
Ivan	--	--	--	--	11.4	11.40	87.0

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 37. Performance of spring wheat grown under irrigated conditions at Larслан, MT.
Planted: 17 April 1998, Harvested: 25 August 1998 Cooperator: Kelly Donovan

Variety	Height, inches	Test weight	Grain protein	Yield, bu/acre	\$/acre ¹ +/- McNeal
ND695	34	57.8	15.7	71.8	79.43
Hagar	32	56.3	14.6	72.2	77.08
ND694	36	59.7	15.8	68.6	63.52
AC Barrie	37	59.2	15.5	68.4	62.53
Ivan	33	57.8	13.4	72.4	59.24
Grandin	34	56.2	14.7	67.5	54.68
Verde	34	55.2	13.8	69.6	53.88
Ernest	35	56.3	15.1	63.8	39.67
Trenton	39	57.7	15.1	63.8	39.67
2398	34	56.8	14.0	64.4	32.34
Keene	38	58.8	15.0	62.1	31.22
2375	34	57.2	14.2	63.6	30.40
Kulm	36	58.3	15.6	60.2	21.77
Stoa	35	56.3	14.9	59.0	14.63
McNeal	35	56.5	14.6	56.5	0.00
Scholar	36	55.2	15.2	55.6	-1.09
Nora	28	56.7	15.2	55.2	-3.08
Amidon	35	54.7	14.6	54.8	-8.35
Lew	38	58.2	15.4	48.3	-37.37
MT9609	36	56.7	14.1	45.0	-60.07
Newana	31	54.2	14.3	42.0	-73.30
Argent	33	57.5	14.9	64.3	**
AC Crystal	31	54.7	12.8	63.1	**
MTHW9420	32	53.5	14.4	47.1	**
average	34.4	56.7	14.70	60.8	
p value	0.000	0.000	0.000	0.000	
CV (S/Mean)	6.6	2.0	1.9	9.8	
CV(SE/Mean)	3.8	1.2	1.1	5.7	
LSD 0.05	3.7	1.9	0.5	9.8	

¹Wheat 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 38. 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
Ivan	--	--	--	--	72.4	72.4	128.1
Hagar	--	--	--	--	72.2	72.2	127.8
ND695	--	--	--	--	71.8	71.8	127.1
ND694	--	--	--	--	68.6	68.6	121.4
Argent	--	--	--	--	64.3	64.3	113.8
Verde	--	--	--	106.7	69.6	88.2	113.0
AC Crystal	--	--	--	--	63.1	63.1	111.7
2375	74.0	66.9	76.7	106.7	63.6	77.6	108.5
2398	--	--	75.0	103.5	64.4	81.0	107.0
Keene	--	--	75.8	100.1	62.1	79.3	104.8
AC Barrie	--	--	--	92.4	68.4	80.4	103.1
Trenton	--	37.4	70.9	97.0	63.8	67.3	100.6
McNeal	89.9	40.3	71.1	99.5	56.5	71.5	100.0
Nora	--	--	--	--	55.2	55.2	97.7
Grandin	73.3	40.0	64.0	103.5	67.5	69.7	97.5
Kulm	66.3	38.6	69.2	106.3	60.2	68.1	95.2
MTHW9420	--	--	--	100.6	47.1	73.9	94.7
Ernest	61.1	40.2	65.5	99.2	63.8	66.0	92.3
Stoa	78.2	35.5	64.1	--	59.0	59.2	91.9
Scholar	--	--	--	87.5	55.6	71.6	91.7
Amidon	74.4	33.0	68.4	94.3	54.8	65.0	90.9
Newana	80.7	34.1	64.9	94.9	42.0	63.3	88.5
Lew	75.5	39.8	57.0	66.8	48.3	57.5	80.4
MT9609	--	--	--	--	45.0	45.0	79.6

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

Table 39. 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
ND694	--	--	--	--	59.7	59.7	105.7
Keene	--	--	61.7	62.7	58.8	61.1	105.2
Kulm	63.7	60.1	62.7	62.0	58.3	61.4	104.4
2375	64.8	60.5	61.0	62.0	57.2	61.1	103.9
AC Barrie	--	--	--	61.8	59.2	60.5	103.6
Lew	64.9	61.0	59.3	59.7	58.2	60.6	103.1
Ernest	64.1	58.7	62.2	61.2	56.3	60.5	102.9
Trenton	--	57.7	60.5	60.3	57.7	59.0	102.3
Ivan	--	--	--	--	57.8	57.8	102.3
ND695	--	--	--	--	57.8	57.8	102.3
Argent	--	--	--	--	57.5	57.5	101.8
Stoa	64.9	56.8	59.7	--	56.3	59.4	101.7
Amidon	63.3	58.6	61.0	60.3	54.7	59.6	101.4
2398	--	--	59.8	60.0	56.8	58.9	101.4
Grandin	63.8	58.6	58.3	60.2	56.2	59.4	101.0
Nora	--	--	--	--	56.7	56.7	100.4
MT9609	--	--	--	--	56.7	56.7	100.4
McNeal	63.2	56.8	57.3	60.3	56.5	58.8	100.0
Hagar	--	--	--	--	56.3	56.3	99.6
Newana	63.6	57.0	58.2	59.7	54.2	58.5	99.5
Scholar	--	--	--	59.2	55.2	57.2	97.9
Verde	--	--	--	58.8	55.2	57.0	97.6
AC Crystal	--	--	--	--	54.7	54.7	96.8
MTHW9420	--	--	--	58.7	53.5	56.1	96.1

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 40. 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	1994	1995	1996	1997	1998	Ave	as % of McNeal
ND694	--	--	--	--	15.8	15.80	108.2
ND695	--	--	--	--	15.7	15.70	107.5
Kulm	17.7	16.2	15.0	13.8	15.6	15.66	106.7
Scholar	--	--	--	14.9	15.2	15.05	106.0
AC Barrie	--	--	--	14.5	15.5	15.00	105.6
Nora	--	--	--	--	15.2	15.20	104.1
Ernest	17.2	15.7	14.6	13.7	15.1	15.26	104.0
Lew	14.5	15.8	14.8	14.8	15.4	15.06	102.6
Stoa	15.9	15.8	14.5	--	14.9	15.28	102.5
Argent	--	--	--	--	14.9	14.90	102.1
Trenton	--	15.8	14.5	13.9	15.1	14.83	101.9
McNeal	15.2	15.4	14.4	13.8	14.6	14.68	100.0
Hagar	--	--	--	--	14.6	14.60	100.0
Keene	--	--	13.8	13.8	15.0	14.20	99.5
Grandin	15.1	14.8	14.6	13.7	14.7	14.58	99.3
Amidon	15.3	15.3	13.8	13.2	14.6	14.44	98.4
2375	15.3	15.2	14.2	12.8	14.2	14.34	97.7
2398	--	--	14.2	13.2	14.0	13.80	96.7
MT9609	--	--	--	--	14.1	14.10	96.6
Newana	14.2	15.0	14.1	13.0	14.3	14.12	96.2
MTHW9420	--	--	--	12.9	14.4	13.65	96.1
Verde	--	--	--	13.0	13.8	13.40	94.4
Ivan	--	--	--	--	13.4	13.40	91.8
AC Crystal	--	--	--	--	12.8	12.80	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.