PROJECT TITLE: Evaluation of spring wheat and durum variety performance in irrigated and dryland off-station trials in six counties in eastern Montana.

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OBJECTIVE:

To evaluate new varieties of spring wheat and durum in different environments in eastern Montana, and to compare experimental lines and new varieties with current varieties.

RESULTS:

Spring wheat - Twenty spring wheat varieties were tested at five dryland and three irrigated sites.

McCone County, Circle, dryland, cooperator: Victor Wagner. Table 1

The experimental site was planted in spring wheat in 1995. Plots were planted on 6 May and harvested on 29 August. Amidon and Trenton yielded most at this site. The average yield was 16.4 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 2-4.

Wibaux County, Wibaux, dryland, cooperator: David Maus. Table 5

The experimental site was fallow in 1995. Plots were planted on 28 May and harvested on 4 Sep. Westbred 926, McNeal and Pioneer 2398 yielded most at this site. The average yield was 33.7 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 6 -8.

Roosevelt County, Poplar, dryland, cooperator: Mark Swank. Table 9

The experimental site was fallow in 1995. Plots were planted on 7 May and harvested on 8 August. Hi-Line, Pioneer 2375 and Amidon yielded most at this site. The average yield was 23.0 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 10-12.

Sheridan County, Reserve, dryland, cooperator: Max Aasheim Table 13

The experimental site was fallow in 1995. Plots were planted on 9 May and harvested on 30 August. McNeal, Hi-Line, and Ernest yielded most at this site. The average yield was 38.7 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 14-16.

Valley County, Nashua, dryland, cooperator: Bill Lauckner Table 17

The experimental site was fallow in 1995. Plots were planted on 30 April and harvested on 28 August. Westbred 936, Express, and Pioneer 2375 yielded most. Average yield was 34.4 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 18-20.

Daniels County, Scobey, irrigated, cooperator: Kenny Benson Table 21

The experimental site is under pivot irrigation. Plots were planted on 8 May and harvested on 3 Sep. Pioneer 2398, Amidon and Lars yielded most. Average yield was 63.2 bu/acre. This was the first year in which a yield trial was conducted at this site, so no summaries are available.

Sheridan County, Dagmar, irrigated, cooperator: Steve Brekke Table 22

The experimental site is under pivot irrigation. Plots were planted on 9 May and harvested on 30 Aug. Pioneer 2375, Keene, and Amidon yielded most. Average yield was 47.5 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 23 through 25.

Valley County, Larslan, irrigated, cooperator: Kelly Donovan Table 26

The experimental site is under pivot irrigation. Plots were planted on 30 Apr and harvested on 28 August. Express, Sonja, and Pioneer 2375 yielded most at this site. The average yield was 70.4 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 27-29.

Durum - Twelve durum varieties were tested at three dryland and two irrigated sites.

McCone County, Circle, dryland, cooperator: Victor Wagner. Table 30.

The experimental site was planted in spring wheat in 1995. Plots were planted on 6 May and harvested on 29 August. Dressler and Renville yielded most at this site. The average yield was 12.7 bu/acre. This was the first year in which a durum yield trial was conducted at this site, so no summaries are available.

Roosevelt County, Poplar, dryland, cooperator: Mark Swank Table 31

The experimental site was fallow in 1995. Plots were planted on 7 May and harvested on 8 August. Plenty and Renville yielded most at this site. The average yield was 21.9 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 32-34.

Sheridan County, Reserve, dryland, cooperator: Max Aasheim Table 35

The experimental site was fallow in 1995. Plots were planted on 9 May and harvested on 30 August. Renville and Vic yielded most at this site. The average yield was 31.2 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 36-38.

Daniels County, Scobey, irrigated, cooperator: Kenny Benson Table 39

The experimental site is under pivot irrigation. Plots were planted on 8 May and harvested on 3 Sep. Kyle and Dressler yielded most. Average yield was 58.3 bu/acre. This was the first year in which a yield trial was conducted at this site, so no summaries are available.

Sheridan County, Dagmar, irrigated, cooperator: Steve Brekke. Table 40

The experimental site is under pivot irrigation. Plots were planted on 9 May and harvested on 30 Aug. Vic and Kyle yielded most. Average yield was 38.3 bu/acre. Five year summaries for yield, test weight, and protein are shown in Tables 41-43.

SUMMARY:

The experiments reported under this project are all of the replicated small plot type conducted under dryland and irrigated conditions. All irrigated sites are under pivots. The County agents plant or help plant the plots in their own and surrounding counties. They help personnel from the Research Center harvest the plots with a plot combine. Soil moisture was generally adequate in eastern Montana this year, but precipitation was scattered so that yields at some sites were low.

FUTURE PLANS:

New varieties will continue to be evaluated and compared with existing varieties at these off-station sites. A fourth irrigated site in Dawson or Prairie County may be included in 1997. Closer cooperation with the Williston Research Center will result in the inclusion of experimental lines from North Dakota as well as Montana in these tests, so that information about their performance will be available when the lines are released as varieties.

Table 1. Performance of spring wheat grown under dryland continuous cropping conditions at Circle, MT. Planted: 6 May 1996 Harvested: 29 August 1996
Cooperator: Victor Wagner

Variety	height, inches	grain protein	test weight	yield, bu/acre
Amidon	21	11.6	62.4	19.5
Trenton	21	13.6	62.1	19.0
Norlander	17	12.8	63.2	17.8
Ernest	21	12.8	63.0	17.7
Stoa	19	12.6	62.1	17.4
Pioneer 2398	17	12.9	61.8	17.4
Keene	18	13.1	63.2	17.0
Westbred 926	17	13.1	61.6	16.8
Grandin	20	12.6	62.7	16.3
Lars	15	11.9	61.7	16.3
McNeal	19	13.1	60.3	16.2
Kulm	19	13.2	63.2	16.1
Lew	19	12.5	62.4	16.0
Hi-Line	18	12.9	62.5	15.9
Sonja	17	13.0	61.5	15.4
Pioneer 2375	16	12.1	61.6	15.0
Westbred 936	16	13.7	62.1	14.9
Hamer	16	14.0	63.1	14.8
Express	17	12.4	62.4	14.8
Newana	18	12.6	62.8	14.6
average	18.0	12.81	62.3	16.4
p value	0.00	0.02	0.00	NS
CV (S/Mean)	6.9	5.3	0.9	12.1
CV(SE/Mean)	4.0	3.1	0.5	7.0
LSD 0.05	2.1	1.1	0.9	--

Table 2. Relative yielding abilities of spring wheat varieties as compared to Newana when grown under dryland conditions in McCone County in cooperation with CES.
Cooperator: Victor Wagner

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Amidon	5	57.5	40.8	32.1	32.6	19.5	36.5	120.9
Pioneer 2398	1	--	--	--	--	17.4	17.4	119.2
Keene	1	--	--	--	--	17.0	17.0	116.4
McNeal	5	46.2	48.7	32.0	29.4	16.2	34.5	114.4
Lew	5	55.9	38.5	33.1	28.5	16.0	34.4	114.1
Stoa	4	--	41.2	29.5	30.5	17.4	29.6	113.8
Ernest	3	--	--	30.8	28.6	17.7	25.7	111.4
Trenton	2	--	--	--	25.7	19.0	22.4	108.0
Pioneer 2375	5	41.7	38.6	35.1	28.6	15.0	31.8	105.4
Westbred 926	3	51.1	--	--	24.5	16.8	30.8	105.0
Norlander	2	--	--	--	25.5	17.8	21.6	104.6
Westbred 936	2	--	--	--	27.9	14.9	21.4	103.4
Lars	2	--	--	--	26.1	16.3	21.2	102.4
Grandin	4	--	39.9	25.4	25.0	16.3	26.6	102.3
Kulm	3	--	--	30.2	23.6	16.1	23.3	101.0
Newana	5	46.6	35.0	27.8	26.8	14.6	30.2	100.0
Sonja	3	--	--	26.2	26.5	15.4	22.7	98.4
Hamer	2	--	--	--	25.9	14.8	20.4	98.3
Express	2	--	--	--	21.7	14.8	18.2	88.2
Hi-Line	5	38.1	32.8	20.6	22.5	15.9	26.0	86.1

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

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Grandin	4	--	61.1	63.8	64.5	62.7	63.0	101.0
Keene	1	--	--	--	--	63.2	63.2	100.6
Lew	5	62.3	60.8	62.9	63.8	62.4	62.4	100.4
Kulm	3	--	--	64.2	64.0	63.2	63.8	100.3
Newana	5	61.5	58.7	63.9	64.1	62.8	62.2	100.0
Pioneer 2375	5	61.9	59.9	63.8	63.8	61.6	62.2	100.0
Amidon	5	62.4	59.3	62.5	63.8	62.4	62.1	99.8
Ernest	3	--	--	64.2	63.2	63.0	63.5	99.8
Westbred 926	3	63.2	--	--	63.2	61.6	62.7	99.8
Hamer	2	--	--	--	63.4	63.1	63.2	99.7
Norlander	2	--	--	--	63.3	63.2	63.2	99.7
Trenton	2	--	--	--	64.3	62.1	63.2	99.6
Hi-Line	5	62.1	57.9	64.3	62.5	62.5	61.9	99.5
McNeal	5	61.7	60.6	62.2	63.3	60.3	61.6	99.1
Stoa	4	--	58.8	62.8	62.9	62.1	61.6	98.8
Pioneer 2398	1	--	--	--	--	61.8	61.8	98.4
Westbred 936	2	--	--	--	62.7	62.1	62.4	98.3
Express	2	--	--	--	62.4	62.4	62.4	98.3
Sonja	3	--	--	62.7	62.8	61.5	62.3	98.0
Lars	2	--	--	--	62.4	61.7	62.0	97.8

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 Newana.

Table 4. Relative protein contents of spring wheat varieties as compared to Newana when grown under dryland conditions in McCone County in cooperation with CES.
Cooperator: Victor Wagner

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Hi-Line	5	14.4	15.9	11.2	13.8	12.9	13.64	110.2
Hamer	2	--	--	--	14.2	14.0	14.10	109.7
Kulm	3	--	--	11.7	14.0	13.2	12.97	109.3
Westbred 926	3	13.8	--	--	13.8	13.1	13.57	107.1
Ernest	3	--	--	10.8	14.0	12.8	12.53	105.6
Trenton	2	--	--	--	13.5	13.6	13.55	105.4
Westbred 936	2	--	--	--	13.4	13.7	13.55	105.4
Grandin	4	--	16.0	10.3	13.3	12.6	13.05	105.2
Stoa	4	--	16.2	10.0	13.4	12.6	13.05	105.2
Express	2	--	--	--	14.6	12.4	13.50	105.1
Norlander	2	--	--	--	14.2	12.8	13.50	105.1
Keene	1	--	--	--	--	13.1	13.10	104.0
McNeal	5	11.8	15.4	10.1	13.8	13.1	12.84	103.7
Pioneer 2375	5	14.2	15.0	9.8	12.7	12.1	12.76	103.1
Pioneer 2398	1	--	--	--	--	12.9	12.90	102.4
Sonja	3	--	--	10.1	13.2	13.0	12.10	102.0
Amidon	5	13.0	14.4	10.7	12.8	11.6	12.50	101.0
Lew	5	12.4	14.6	10.0	12.9	12.5	12.48	100.8
Newana	5	12.3	14.0	9.9	13.1	12.6	12.38	100.0
Lars	2	--	--	--	13.3	11.9	12.60	98.1

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 Newana.

Table 5. Performance of spring wheat grown under dryland conditions at Wibaux, MT.
Planted: 28 May 1996 Harvested: 4 September 1996
Cooperator: David Maus

Variety	height, inches	grain protein	test weight	yield, bu/acre
Westbred 926	23	12.7	61.0	38.4
McNeal	27	12.5	60.8	38.2
Pioneer 2398	25	12.2	61.7	37.5
Ernest	33	12.0	62.0	37.0
Hi-Line	26	12.6	62.2	36.8
Pioneer 2375	27	11.8	61.7	36.5
Stoa	31	12.4	61.0	34.9
Sonja	23	12.0	61.0	34.9
Hamer	23	12.2	62.0	33.8
Trenton	32	12.1	62.5	33.6
Amidon	32	11.7	61.5	33.4
Norlander	24	12.4	62.0	33.3
Westbred 936	24	12.6	60.8	32.7
Kulm	29	12.0	63.0	31.5
Lars	22	12.1	60.0	31.1
Lew	31	12.6	62.7	30.6
Keene	33	12.3	62.8	30.5
Express	24	13.0	61.7	30.0
Grandin	28	12.2	61.8	29.8
Newana	27	11.6	62.7	29.4
average	27.3	12.25	61.7	33.7
p value	0.00	NS	0.00	0.01
CV (S/Mean)	5.2	4.7	0.8	9.9
CV(SE/Mean)	3.0	2.7	0.5	5.7
LSD 0.05	2.3	--	0.8	5.5

Table 6. Relative yielding abilities of spring wheat varieties as compared to Newana when grown under dryland conditions in Wibaux County in cooperation with CES.
Cooperator: David Maus

Cultivar	# of years	1991	1992	1993	1995	1996	Ave	as % of Newana
Pioneer 2398	1	--	--	--	--	37.5	37.5	127.6
Sonja	2	--	--	--	32.3	34.9	33.6	121.7
Ernest	2	--	--	--	27.8	37.0	32.4	117.4
Trenton	2	--	--	--	30.8	33.6	32.2	116.7
Stoa	4	20.4	--	33.9	33.7	34.9	30.7	115.9
McNeal	4	--	59.1	44.3	32.8	38.2	43.6	115.1
Lars	2	--	--	--	32.2	31.1	31.6	114.7
Norlander	2	--	--	--	29.8	33.3	31.6	114.3
Kulm	2	--	--	--	31.0	31.5	31.2	113.2
Amidon	5	25.6	71.9	33.2	28.6	33.4	38.5	111.9
Pioneer 2375	5	32.8	53.9	40.5	27.2	36.5	38.2	110.9
Keene	1	--	--	--	--	30.5	30.5	103.7
Hamer	2	--	--	--	22.6	33.8	28.2	102.2
Grandin	4	20.3	--	33.9	24.1	29.8	27.0	102.0
Westbred 936	2	--	--	--	23.5	32.7	28.1	101.8
Newana	5	20.7	66.2	30.1	25.8	29.4	34.4	100.0
Lew	5	21.3	54.9	36.5	26.1	30.6	33.9	98.4
Westbred 926	4	19.1	50.1	--	20.7	38.4	32.1	90.3
Hi-Line	5	17.3	47.6	35.1	17.5	36.8	30.9	89.6
Express	2	--	--	--	17.7	30.0	23.8	86.4

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 Newana.

Table 7. Relative test weights of spring wheat varieties as compared to Newana when grown under dryland conditions in Wibaux County in cooperation with CES.
Cooperator: David Maus

Cultivar	# of years	1991	1992	1993	1995	1996	Ave	as % of Newana
Lew	5	57.8	63.6	62.8	62.2	62.7	61.8	101.2
Amidon	5	58.7	62.4	63.0	62.1	61.5	61.5	100.8
Grandin	4	56.9	--	62.3	62.7	61.8	60.9	100.7
Kulm	2	--	--	--	63.2	63.0	63.1	100.7
Keene	1	--	--	--	--	62.8	62.8	100.2
Trenton	2	--	--	--	62.9	62.5	62.7	100.1
Newana	5	55.3	63.2	61.5	62.6	62.7	61.1	100.0
Pioneer 2375	5	57.0	63.4	61.3	61.8	61.7	61.0	99.9
Norlander	2	--	--	--	61.8	62.0	61.9	98.8
Westbred 926	4	54.8	63.1	--	61.7	61.0	60.2	98.7
Stoa	4	55.8	--	60.5	61.6	61.0	59.7	98.7
Hamer	2	--	--	--	61.7	62.0	61.8	98.7
Hi-Line	5	54.2	63.1	60.6	60.8	62.2	60.2	98.6
Ernest	2	--	--	--	61.4	62.0	61.7	98.5
Pioneer 2398	1	--	--	--	--	61.7	61.7	98.4
McNeal	4	--	62.0	61.2	61.6	60.8	61.4	98.2
Sonja	2	--	--	--	61.9	61.0	61.4	98.1
Express	2	--	--	--	60.7	61.7	61.2	97.7
Westbred 936	2	--	--	--	61.0	60.8	60.9	97.2
Lars	2	--	--	--	61.4	60.0	60.7	96.9

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 Newana.

Table 8. Relative protein contents of spring wheat varieties as compared to Newana when grown under dryland conditions in Wibaux County in cooperation with CES.
Cooperator: David Maus

Cultivar	# of years	1991	1992	1993	1995	1996	Ave	as % of Newana
Westbred 936	2	--	--	--	13.1	12.6	12.85	112.2
Hi-Line	5	18.3	14.6	13.2	13.0	12.6	14.34	110.8
Westbred 926	4	17.7	15.2	--	13.4	12.7	14.75	109.9
Express	2	--	--	--	12.1	13.0	12.55	109.6
Ernest	2	--	--	--	13.0	12.0	12.50	109.2
Grandin	4	17.6	--	12.8	12.5	12.2	13.78	109.1
Lew	5	18.0	14.4	12.2	13.1	12.6	14.06	108.7
Stoa	4	18.0	--	11.8	11.9	12.4	13.53	107.1
Norlander	2	--	--	--	12.1	12.4	12.25	107.0
McNeal	4	--	14.8	12.0	12.1	12.5	12.85	106.9
Kulm	2	--	--	--	12.4	12.0	12.20	106.6
Hamer	2	--	--	--	12.1	12.2	12.15	106.1
Keene	1	--	--	--	--	12.3	12.30	106.0
Pioneer 2375	5	17.2	14.6	12.6	12.2	11.8	13.68	105.7
Pioneer 2398	1	--	--	--	--	12.2	12.20	105.2
Sonja	2	--	--	--	11.9	12.0	11.95	104.4
Trenton	2	--	--	--	11.8	12.1	11.95	104.4
Amidon	5	16.8	14.2	11.6	12.8	11.7	13.42	103.7
Lars	2	--	--	--	11.2	12.1	11.65	101.7
Newana	5	16.6	14.2	11.0	11.3	11.6	12.94	100.0

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 Newana.

Table 9. Performance of spring wheat grown under dryland conditions at Poplar, MT.
Planted: 7 May 1996 Harvested: 8 August 1996
Cooperator: Mark Swank

Variety	height, inches	grain protein	test weight	yield, bu/acre
HiLine	24	14.4	60.8	26.1
Pioneer 2375	24	13.7	60.8	25.9
Amidon	27	13.4	60.3	25.8
McNeal	23	14.2	60.3	24.7
Sonja	23	14.6	59.1	24.5
Norlander	23	14.1	61.3	24.2
Stoa	26	13.5	60.2	24.0
Keene	26	14.5	60.7	23.5
Ernest	25	14.0	61.3	23.4
Westbred 936	21	14.6	60.2	23.4
Trenton	26	14.3	61.2	23.0
Kulm	25	14.2	62.7	22.8
Pioneer 2398	22	15.2	59.8	22.7
Hamer	22	14.6	60.3	22.1
Grandin	25	14.1	60.9	21.9
Express	21	14.6	60.8	20.7
Westbred 926	23	15.1	59.3	20.5
Newana	23	13.5	60.3	20.3
Lars	20	14.6	56.4	20.1
Lew	26	14.8	59.5	19.5
average	23.7	14.30	60.3	23.0
p value	0.00	NS	0.00	0.04
CV (S/Mean)	5.6	4.8	1.6	10.8
CV(SE/Mean)	3.2	2.8	0.9	6.3
LSD 0.05	2.2	1.1	1.6	4.1

Table 10. Relative yields of spring wheat varieties as compared to Newana when grown under dryland conditions in Roosevelt County in cooperation with CES.
Cooperator: Mark Swank

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Keene	1	--	--	--	--	23.5	23.5	115.8
Pioneer 2398	1	--	--	--	--	22..7	22.7	111.8
McNeal	5	58.3	61.5	50.9	38.1	24.7	46.7	110.8
Norlander	2	--	--	--	34.6	24.2	29.4	109.3
Amidon	5	58.9	55.1	52.5	37.2	25.8	45.9	108.9
Express	2	--	--	--	36.9	20.7	28.8	107.1
Lars	2	--	--	--	36.4	20.1	28.2	105.0
Westbred 936	2	--	--	--	31.8	23.4	27.6	102.6
Grandin	4	--	59.4	46.2	33.8	21.9	40.3	101.7
Trenton	2	--	--	--	31.3	23.0	27.2	100.9
Newana	5	52.1	55.6	49.2	33.5	20.3	42.1	100.0
Ernest	3	--	--	45.5	34.0	23.4	34.3	99.9
Stoa	4	--	53.4	46.8	34.1	24.0	39.6	99.8
Pioneer 2375	5	44.3	54.2	55.1	30.1	25.9	41.9	99.5
Sonja	3	--	--	54.5	22.6	24.5	33.9	98.6
Kulm	3	--	--	45.4	32.4	22.8	33.5	97.7
Hi-Line	5	44.1	51.8	48.7	33.7	26.1	40.9	97.0
Lew	5	54.4	46.7	46.3	32.8	19.5	39.9	94.8
Hamer	2	--	--	--	28.0	22.1	25.0	93.1
Westbred 926	3	39.4	--	--	25.5	20.5	28.5	80.6

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 Newana.

Table 11. Relative test weights of spring wheat varieties as compared to Newana when grown under dryland conditions in Roosevelt County in cooperation with CES.
Cooperator: Mark Swank

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Kulm	3	--	--	63.2	62.1	62.7	62.7	104.6
Ernest	3	--	--	63.4	59.0	61.3	61.2	102.2
Lew	5	64.5	61.4	62.5	59.9	59.5	61.6	101.7
Pioneer 2375	5	64.0	60.7	62.4	59.0	60.8	61.4	101.4
Grandin	4	--	61.1	61.6	58.3	60.9	60.5	101.3
Norlander	2	--	--	--	58.7	61.3	60.0	101.0
Keene	1	--	--	--	--	60.7	60.7	100.7
McNeal	5	63.3	61.0	61.2	58.8	60.3	60.9	100.6
Amidon	5	63.1	60.7	62.0	58.5	60.3	60.9	100.6
Hi-Line	5	64.2	59.8	61.5	57.3	60.8	60.7	100.3
Trenton	2	--	--	--	57.9	61.2	59.6	100.3
Hamer	2	--	--	--	58.6	60.3	59.4	100.1
Newana	5	64.0	59.1	60.9	58.5	60.3	60.6	100.0
Stoa	4	--	60.5	60.9	57.2	60.2	59.7	100.0
Express	2	--	--	--	58.0	60.8	59.4	100.0
Pioneer 2398	1	--	--	--	--	59.8	59.8	99.2
Sonja	3	--	--	61.2	56.6	59.1	59.0	98.4
Westbred 926	3	63.3	--	--	56.3	59.3	59.6	97.9
Westbred 936	2	--	--	--	55.9	60.2	58.0	97.7
Lars	2	--	--	--	57.8	56.4	57.1	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 Newana.

Table 12. Relative protein contents of spring wheat varieties as compared to Newana when grown under dryland conditions in Roosevelt County in cooperation with CES.
Cooperator: Mark Swank

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Pioneer 2398	1	--	--	--	--	15.2	15.20	112.6
Hi-Line	5	14.7	14.2	11.8	15.1	14.4	14.04	110.6
Westbred 926	3	14.5	--	--	14.6	15.1	14.73	109.7
Stoa	4	--	14.6	12.1	15.3	13.5	13.88	109.3
Lew	5	13.0	14.0	11.9	14.9	14.8	13.72	108.0
Kulm	3	--	--	12.5	15.1	14.2	13.93	107.7
Trenton	2	--	--	--	15.4	14.3	14.85	107.6
Grandin	4	--	13.7	11.7	15.1	14.1	13.65	107.5
Keene	1	--	--	--	--	14.5	14.50	107.4
Hamer	2	--	--	--	15.0	14.6	14.80	107.2
McNeal	5	13.2	13.5	11.3	15.3	14.2	13.50	106.3
Amidon	5	14.0	14.2	11.4	14.5	13.4	13.50	106.3
Sonja	3	--	--	11.7	14.9	14.6	13.73	106.2
Pioneer 2375	5	14.0	13.2	11.6	14.8	13.7	13.46	106.0
Ernest	3	--	--	12.1	15.0	14.0	13.70	105.9
Westbred 936	2	--	--	--	14.6	14.6	14.60	105.8
Express	2	--	--	--	14.6	14.6	14.60	105.8
Lars	2	--	--	--	14.4	14.6	14.50	105.1
Norlander	2	--	--	--	14.3	14.1	14.20	102.9
Newana	5	12.7	12.0	11.2	14.1	13.5	12.70	100.0

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

Table 13. Performance of spring wheat grown under dryland conditions at Reserve, MT.
Planted: 9 May 1996 Harvested: 30 August 1996
Cooperator: Max Aasheim

Variety	height, inches	grain protein	test weight	yield, bu/acre
McNeal	23	13.9	63.0	45.8
Hi-Line	19	14.3	64.0	43.6
Ernest	24	14.4	63.8	43.2
Newana	21	13.0	63.8	43.0
Keene	21	13.4	64.0	41.8
Stoa	23	13.4	63.2	40.8
Trenton	23	13.5	64.3	40.0
Amidon	24	14.0	63.7	39.2
Sonja	18	13.6	63.7	38.5
Hamer	18	13.8	64.5	38.3
Lew	24	13.3	64.2	37.9
Pioneer 2375	18	14.2	64.0	37.4
Express	17	13.6	63.7	37.2
Lars	16	13.1	63.2	37.2
Pioneer 2398	18	14.1	64.2	36.6
Westbred 926	19	13.8	63.0	36.0
Grandin	21	14.0	64.3	35.7
Kulm	20	14.1	64.5	35.4
Norlander	19	14.4	63.8	34.1
Westbred 936	15	14.1	63.8	32.3
average	20.2	13.80	63.8	38.7
p value	0.00	0.00	0.00	0.00
CV (S/Mean)	5.9	2.8	0.5	9.0
CV(SE/Mean)	3.4	1.6	0.3	5.2
LSD 0.05	2.0	0.64	0.5	5.8

Table 14. Relative yielding abilities of spring wheat varieties as compared to Newana when grown under dryland conditions in Sheridan County in cooperation with CES.
Cooperator: Max Aasheim

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
McNeal	5	38.3	31.7	58.2	29.9	45.8	40.8	109.7
Grandin	4	--	48.6	49.0	23.6	35.7	39.2	106.3
Sonja	3	--	--	61.0	29.2	38.5	42.9	106.0
Stoa	4	--	27.5	57.6	24.8	40.8	37.7	102.1
Ernest	3	--	--	52.2	26.2	43.2	40.5	100.2
Newana	5	38.3	26.2	51.4	27.0	43.0	37.2	100.0
Amidon	5	35.2	27.8	54.0	28.5	39.2	36.9	99.4
Keene	1	--	--	--	--	41.8	41.8	97.2
Lew	5	36.5	24.7	51.4	26.6	37.9	35.4	95.3
Trenton	2	--	--	--	26.5	40.0	33.2	95.0
Lars	2	--	--	--	29.1	37.2	33.2	94.7
Express	2	--	--	--	29.0	37.2	33.1	94.6
Hi-Line	5	30.9	18.7	51.8	27.7	43.6	34.5	92.9
Hamer	2	--	--	--	25.6	38.3	32.0	91.3
Kulm	3	--	--	51.1	24.2	35.4	36.9	91.2
Norlander	2	--	--	--	29.0	34.1	31.6	90.1
Pioneer 2375	5	18.3	26.6	58.0	26.3	37.4	33.3	89.6
Pioneer 2398	1	--	--	--	--	36.6	36.6	85.1
Westbred 926	3	26.7	--	--	26.0	36.0	29.6	81.9
Westbred 936	2	--	--	--	22.8	32.3	27.6	78.7

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 Newana.

Table 15. Relative test weights of spring wheat varieties as compared to Newana when grown under dryland conditions in Sheridan County in cooperation with CES.
Cooperator: Max Aasheim

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Kulm	3	--	--	63.4	63.0	64.5	63.6	103.2
Lew	5	63.1	62.7	60.0	63.1	64.2	62.6	101.9
Grandin	4	--	61.1	60.5	62.7	64.3	62.2	101.2
Ernest	3	--	--	62.2	60.7	63.8	62.2	101.0
Pioneer 2398	1	--	--	--	--	64.2	64.2	100.6
Pioneer 2375	5	61.1	61.2	61.8	60.6	64.0	61.7	100.5
Hi-Line	5	61.6	60.0	61.4	61.7	64.0	61.7	100.5
Keene	1	--	--	--	--	64.0	64.0	100.3
Amidon	5	60.8	61.7	59.9	61.7	63.7	61.6	100.2
Newana	5	61.7	60.7	59.1	62.0	63.8	61.5	100.0
McNeal	5	60.6	61.0	60.5	61.9	63.0	61.4	99.9
Trenton	2	--	--	--	61.4	64.3	62.8	99.9
Sonja	3	--	--	60.0	60.9	63.7	61.5	99.8
Express	2	--	--	--	61.9	63.7	62.8	99.8
Stoa	4	--	60.4	60.0	61.3	63.2	61.2	99.7
Hamer	2	--	--	--	60.1	64.5	62.3	99.0
Norlander	2	--	--	--	60.6	63.8	62.2	98.9
Westbred 926	3	61.6	--	--	59.7	63.0	61.4	98.7
Westbred 936	2	--	--	--	59.8	63.8	61.8	98.3
Lars	2	--	--	--	59.0	63.2	61.1	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 Newana.

Table 16. Relative protein contents of spring wheat varieties as compared to Newana when grown under dryland conditions in Sheridan County in cooperation with CES.
Cooperator: Max Aasheim

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Westbred 936	2	--	--	--	10.8	14.1	12.4	109.2
Ernest	3	--	--	13.9	10.4	14.4	12.9	108.7
Hi-Line	5	13.6	14.6	12.7	11.2	14.3	13.3	108.5
Pioneer 2398	1	--	--	--	--	14.1	14.1	108.5
Westbred 926	3	14.2	--	--	11.0	13.8	13.0	108.3
Kulm	3	--	--	13.5	10.8	14.1	12.8	107.9
Sonja	3	--	--	14.2	10.4	13.6	12.7	107.3
Amidon	5	13.4	14.0	14.0	10.0	14.0	13.1	106.9
Stoa	4	--	13.6	14.2	10.0	13.4	12.8	106.7
Norlander	2	--	--	--	9.8	14.4	12.1	106.1
Lew	5	13.3	14.0	13.9	10.3	13.3	13.0	105.9
Hamer	2	--	--	--	10.3	13.8	12.0	105.7
Express	2	--	--	--	10.4	13.6	12.0	105.3
Grandin	4	--	13.7	12.2	10.3	14.0	12.6	104.6
McNeal	5	13.9	12.8	12.8	10.4	13.9	12.8	104.2
Trenton	2	--	--	--	10.1	13.5	11.8	103.1
Keene	1	--	--	--	--	13.4	13.4	103.1
Pioneer 2375	5	13.0	13.0	12.4	10.2	14.2	12.6	102.6
Lars	2	--	--	--	9.8	13.1	11.4	100.4
Newana	5	13.2	12.4	12.8	9.8	13.0	12.2	100.0

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

Table 17. Performance of spring wheat grown under dryland conditions at Nashua, MT.
Planted: 30 April 1996, Harvested: 28 August 1996
Severe hail damage 3 June
Cooperator: Bill Lauckner

Variety	height, inches	grain protein	test weight	yield, bu/acre
Westbred 936	17	14.0	62.0	38.7
Express	17	14.3	62.2	37.5
Pioneer 2375	18	13.6	61.5	37.4
Newana	20	12.7	62.0	37.0
Sonja	18	14.0	60.7	36.7
Pioneer 2398	19	14.6	61.5	36.5
Westbred 926	19	13.3	62.0	36.2
Keene	22	12.8	63.0	35.1
Trenton	22	14.6	61.2	34.5
McNeal	20	14.3	60.3	34.4
Amidon	21	13.8	61.5	33.8
Lars	18	12.8	61.2	33.6
Hamer	20	13.8	62.2	33.5
Grandin	20	14.7	61.7	32.9
Norlander	19	13.9	62.3	32.6
Hi-Line	20	13.6	61.8	32.0
Lew	23	13.0	61.8	31.9
Kulm	22	14.7	62.8	31.5
Ernest	20	14.3	62.2	31.0
Tioga	--	13.3	61.8	30.7
Stoa	21	13.7	61.2	30.6
average	19.8	13.82	61.8	34.4
p value	0.00	NS	NS	0.02
CV (S/Mean)	6.8	7.3	1.6	8.4
CV(SE/Mean)	4.0	4.2	0.9	4.8
LSD 0.05	2.2	--	--	4.8

Table 18. Relative yielding abilities of spring wheat varieties as compared to Newana when grown under dryland conditions in Valley County in cooperation with CES.
Cooperator: Bill Lauckner

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Westbred 936	2	--	--	--	48.1	38.7	43.4	128.2
Express	2	--	--	--	47.1	37.5	42.3	125.0
Norlander	2	--	--	--	47.1	32.6	39.8	117.7
McNeal	5	55.6	58.7	60.0	44.0	34.4	50.5	117.2
Lars	2	--	--	--	45.3	33.6	39.4	116.5
Hamer	2	--	--	--	40.3	33.5	36.9	
Sonja	3	--	--	60.6	38.4	36.7	45.2	105.2
Amidon	5	51.2	45.1	51.4	43.7	33.8	45.0	104.4
Grandin	4	--	45.3	45.9	42.4	32.9	42.4	103.4
Stoa	4	--	38.3	56.0	40.6	30.6	41.4	100.9
Pioneer 2375	5	52.2	42.8	52.4	31.4	37.4	43.2	100.2
Newana	5	51.7	35.0	61.3	30.7	37.0	43.1	100.0
Trenton	2	--	--	--	32.9	34.5	33.7	99.6
Pioneer 2398	1	--	--	--	--	36.5	36.5	98.6
Hi-Line	5	49.9	36.3	48.0	39.3	32.0	41.1	95.3
Kulm	3	--	--	52.8	38.3	31.5	40.9	95.0
Lew	5	49.5	36.4	54.8	32.0	31.9	40.9	94.9
Keene	1	--	--	--	--	35.1	35.1	94.9
Ernest	3	--	--	52.8	37.4	31.0	40.4	94.0
Tioga	3	--	--	53.1	36.4	30.7	40.1	93.2
Westbred 926	3	37.5	--	--	35.7	36.2	36.5	91.6

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 Newana.

Table 19. Relative test weights of spring wheat varieties as compared to Newana when grown under dryland conditions in Valley County in cooperation with CES.
Cooperator: Bill Lauckner

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Kulm	3	--	--	63.8	61.2	62.8	62.6	104.2
Ernest	3	--	--	63.2	59.9	62.2	61.8	102.8
Lew	5	63.7	58.7	61.9	60.8	61.8	61.4	101.9
Amidon	5	64.2	58.5	62.1	60.8	61.3	61.4	101.9
Keene	1	--	--	--	--	63.0	63.0	101.6
Grandin	4	--	60.0	60.2	58.6	61.7	60.1	101.5
Tioga	3	--	--	61.5	59.0	61.8	60.8	101.2
Pioneer 2375	5	64.8	57.7	60.6	60.0	61.5	60.9	101.1
Express	2	--	--	--	59.4	62.2	60.8	100.8
Trenton	2	--	--	--	59.9	61.2	60.6	100.4
Newana	5	64.3	56.8	59.6	58.6	62.0	60.3	100.0
Westbred 936	2	--	--	--	58.6	62.0	60.3	100.0
Hamer	2	--	--	--	58.4	62.2	60.3	100.0
Hi-Line	5	64.7	57.1	58.4	59.0	61.8	60.2	99.9
McNeal	5	63.2	59.4	58.3	59.6	60.3	60.2	99.8
Norlander	2	--	--	--	58.1	62.3	60.2	99.8
Stoa	4	--	56.5	59.7	58.8	61.2	59.0	99.7
Westbred 926	3	63.5	--	--	58.1	62.0	61.2	99.3
Pioneer 2398	1	--	--	--	--	61.5	61.5	99.2
Sonja	3	--	--	58.9	58.2	60.7	59.3	98.7
Lars	2	--	--	--	57.4	61.2	59.3	98.3

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 Newana.

Table 20. Relative protein contents of spring wheat varieties as compared to Newana when grown under dryland conditions in Valley County in cooperation with CES.
Cooperator: Bill Lauckner

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Pioneer 2398	1	--	--	--	--	14.6	14.60	117.3
Trenton	2	--	--	--	14.8	14.6	14.70	109.3
Stoa	4	--	16.4	14.9	15.1	13.7	15.02	107.9
Grandin	4	--	15.8	14.8	14.5	14.7	14.95	107.4
Ernest	3	--	--	14.7	14.8	14.3	14.60	107.4
Westbred 926	4	16.3	16.2	--	14.7	13.3	15.13	107.1
Kulm	3	--	--	14.5	14.5	14.7	14.57	107.1
Westbred 936	2	--	--	--	14.8	14.0	14.40	107.1
McNeal	5	15.5	15.4	15.0	14.8	14.3	15.0	106.5
Tioga	3	--	--	14.2	15.6	13.3	14.37	105.6
Express	2	--	--	--	14.1	14.3	14.20	105.6
Hi-Line	5	16.0	14.5	15.6	14.6	13.6	14.86	105.5
Sonja	3	--	--	14.0	14.6	14.0	14.20	104.4
Norlander	2	--	--	--	13.9	13.9	13.90	103.3
Amidon	5	14.8	15.3	14.2	14.2	13.8	14.46	102.7
Lew	5	14.8	15.4	13.8	15.0	13.0	14.40	102.3
Hamer	2	--	--	--	13.7	13.8	13.75	102.2
Pioneer 2375	5	15.4	14.6	13.7	14.5	13.6	14.36	102.0
Keene	1	--	--	--	--	12.8	12.80	100.8
Lars	2	--	--	--	14.2	12.8	13.50	100.4
Newana	5	14.7	14.9	13.9	14.2	12.7	14.08	100.0

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

Table 21. Performance of spring wheat grown under irrigated conditions at Scobey, MT.
Planted: 8 May 1996
Harvested: 3 September 1996
Cooperator: Kenny Benson

Variety	height, inches	lodging index	grain protein	test weight	yield, bu/acre
Pioneer 2398	31	1.3	13.4	64.0	74.6
Amidon	35	1.3	13.6	63.8	72.1
Lars	26	0.0	12.4	62.2	69.7
McNeal	33	1.3	13.8	63.2	68.6
Hi-Line	27	0.0	12.8	63.8	66.8
Norlander	29	0.0	13.9	63.0	65.7
Sonja	25	0.0	13.3	64.0	65.3
Hamer	29	0.3	13.0	63.5	64.3
Newana	29	0.0	12.7	63.5	64.2
Pioneer 2375	29	1.7	13.5	63.7	63.9
Express	26	0.0	13.8	63.0	63.2
Grandin	32	0.3	14.2	64.0	62.9
Lew	38	5.5	13.9	64.3	61.8
Westbred 936	26	0.0	13.9	62.0	61.3
Ernest	35	0.7	14.1	64.3	61.2
Keene	35	0.0	14.4	64.5	58.5
Stoa	35	0.0	13.8	63.0	57.1
Kulm	27	0.0	14.9	64.0	56.7
Trenton	34	0.3	14.4	64.0	54.4
Westbred 926	26	0.0	13.7	62.3	52.2
average	30.3	0.6	13.68	63.5	63.2
p value	0.00	0.00	0.00	0.00	0.00
CV (S/Mean)	5.4	95	1.6	0.5	6.0
CV(SE/Mean)	3.1	55	0.9	0.3	3.4
LSD 0.05	2.7	1.0	0.4	0.5	6.3

Table 22. Performance of spring wheat grown under irrigated conditions at Dagmar, MT.
Planted: 9 May 1996
Harvested: 30 August 1996
Cooperator: Steve Brekke

Variety	height, cm	grain protein	test weight	yield, bu/acre
Pioneer 2375	59	11.1	62.8	62.5
Keene	63	11.0	63.3	54.0
Amidon	72	10.8	62.8	53.3
Trenton	62	11.2	63.2	49.9
Hamer	56	11.4	62.8	49.8
Lars	50	10.8	61.2	48.7
McNeal	60	11.0	62.0	48.6
Hi-Line	59	12.4	62.3	48.6
Newana	62	11.2	63.3	47.8
Westbred 926	55	12.8	60.2	47.8
Stoa	65	11.7	61.0	47.5
Sonja	52	11.6	61.5	47.5
Ernest	66	10.9	63.2	47.4
Pioneer 2398	54	12.0	61.2	46.6
Lew	76	11.7	63.7	46.5
Kulm	58	11.6	64.0	45.6
Norlander	61	11.8	62.3	44.8
Express	57	12.6	60.3	40.9
Grandin	58	11.2	62.7	38.8
Westbred 936	52	13.7	58.7	34.3
average	59.9	11.63	62.1	47.5
p value	0.00	0.00	0.00	0.00
CV (S/Mean)	7.9	4.8	1.8	6.9
CV(SE/Mean)	4.6	2.8	1.0	4.0
LSD 0.05	7.9	0.9	1.9	5.4

Table 23. 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	# of years	1990	1991	1992	1993	1996	Ave	as % of Newana
Pioneer 2375	3	--	37.8	--	80.3	62.5	60.2	116.9
Keene	1	--	--	--	--	54.0	54.0	113.0
Amidon	5	60.5	38.4	82.5	91.3	53.3	65.2	110.3
McNeal	3	--	--	93.9	79.5	48.6	74.0	108.9
Trenton	1	--	--	--	--	49.9	49.9	104.4
Hamer	1	--	--	--	--	49.8	49.8	104.2
Sonja	2	--	--	--	77.0	47.5	62.2	103.5
Stoa	3	59.1	37.6	--	--	47.5	48.1	103.4
Lars	1	--	--	--	--	48.7	48.7	101.9
Hi-Line	5	52.1	37.4	90.2	69.9	48.6	59.6	100.9
Newana	5	57.4	34.2	83.6	72.5	47.8	59.1	100.0
Ernest	1	--	--	--	--	47.4	47.4	99.2
Westbred 936	2	--	--	95.5	--	34.3	64.9	98.8
Pioneer 2398	1	--	--	--	--	46.6	46.6	97.5
Lew	3	51.1	37.5	--	--	46.5	45.0	96.9
Kulm	1	--	--	--	--	45.6	45.6	95.4
Grandin	4	51.1	38.8	--	69.9	38.8	49.6	93.7
Norlander	1	--	--	--	--	44.8	44.8	93.7
Westbred 926	4	35.1	34.3	72.0	--	47.8	47.3	84.8
Express	2	--	--	68.6	--	40.9	54.8	83.3

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 Newana.

Table 24. 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	# of years	1990	1991	1992	1993	1996	Ave	as % of Newana
Pioneer 2375	3	--	58.7	--	60.7	62.8	60.7	103.6
Lew	3	59.0	59.9	--	--	63.7	60.9	103.0
Grandin	4	60.0	58.5	--	59.8	62.7	60.2	102.6
Kulm	1	--	--	--	--	64.0	64.0	101.1
Hi-Line	5	60.0	58.5	58.2	57.9	62.3	59.4	100.9
McNeal	3	--	--	59.7	60.1	62.0	60.6	100.9
Amidon	5	58.0	57.1	59.0	59.5	62.8	59.3	100.7
Sonja	2	--	--	--	60.2	61.5	60.8	100.7
Stoa	3	58.5	58.3	--	--	61.0	59.3	100.3
Newana	5	58.5	55.5	59.3	57.6	63.3	58.8	100.0
Keene	1	--	--	--	--	63.3	63.3	100.0
Ernest	1	--	--	--	--	63.2	63.2	99.8
Trenton	1	--	--	--	--	63.2	63.2	99.8
Hamer	1	--	--	--	--	62.8	62.8	99.2
Westbred 926	4	58.0	56.7	59.4	--	60.2	58.6	99.0
Norlander	1	--	--	--	--	62.3	62.3	98.4
Westbred 936	2	--	57.8	--	--	58.7	58.2	98.1
Express	2	--	--	58.4	--	60.3	59.4	96.8
Lars	1	--	--	--	--	61.2	61.2	96.7
Pioneer 2398	1	--	--	--	--	61.2	61.2	96.7

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

Table 25. 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	# of years	1990	1991	1992	1993	1996	Ave	as % of Newana
Westbred 936	2	--	--	13.9	--	13.7	13.80	118.4
Express	2	--	--	13.0	--	12.6	12.80	109.9
Westbred 926	4	15.3	14.6	12.2	--	12.8	13.72	108.7
Hi-Line	5	14.6	14.8	12.8	14.8	12.4	13.88	107.3
Pioneer 2398	1	--	--	--	--	12.0	12.00	107.1
Stoa	3	15.3	14.1	--	--	11.7	13.70	107.0
Lew	3	15.1	14.1	--	--	11.7	13.63	106.5
Sonja	2	--	--	--	15.2	11.6	13.40	105.5
Norlander	1	--	--	--	--	11.8	11.80	105.4
Grandin	4	14.8	14.2	--	15.0	11.2	13.80	104.9
Amidon	5	15.0	13.8	13.1	15.0	10.8	13.54	104.6
Kulm	1	--	--	--	--	11.6	11.60	103.6
Hamer	1	--	--	--	--	11.4	11.40	101.8
Newana	5	13.6	13.6	12.1	14.2	11.2	12.94	100.0
Trenton	1	--	--	--	--	11.2	11.20	100.0
Keene	1	--	--	--	--	11.0	11.00	98.2
McNeal	3	--	--	10.8	14.8	11.0	12.20	97.6
Pioneer 2375	3	--	12.8	--	14.1	11.1	12.67	97.4
Ernest	1	--	--	--	--	10.9	10.90	97.3
Lars	1	--	--	--	--	10.8	10.80	96.4

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 Newana.

Table 26. Performance of spring wheat grown under irrigated conditions at Larslan, MT.
Planted: 30 April 1996 Harvested: 28 August 1996
Cooperator: Kelly Donovan

Variety	height, inches	grain protein	test weight	yield, bu/acre
Express	23	14.0	59.0	79.8
Sonja	26	14.8	56.5	76.9
Pioneer 2375	30	14.2	61.0	76.7
Keene	33	13.8	61.7	75.8
Norlander	28	13.7	60.8	75.3
Pioneer 2398	28	14.2	59.8	75.0
Hamer	30	14.0	59.8	73.4
Westbred 926	27	14.4	57.3	71.8
McNeal	30	14.4	57.3	71.1
Trenton	35	14.5	60.5	70.9
Westbred 936	24	14.8	57.3	70.8
Kulm	31	15.0	62.7	69.2
Lars	26	14.0	56.8	68.9
Amidon	33	13.8	61.0	68.4
Hi-Line	28	14.4	58.5	68.4
Ernest	30	14.6	62.2	65.5
Newana	29	14.1	58.2	64.9
Stoa	33	14.5	59.7	64.1
Grandin	30	14.6	58.3	64.0
Lew	35	14.8	59.3	57.0
average	29.5	14.33	59.4	70.4
p value	0.00	0.00	0.00	0.00
CV (S/Mean)	5.0	2.0	1.2	7.5
CV(SE/Mean)	2.9	1.2	0.7	4.4
LSD 0.05	2.4	0.5	1.2	8.8

Table 27. Relative yields of spring wheat varieties as compared to Newana when grown under irrigated conditions in Valley County in cooperation with CES.
Cooperator: Kelly Donovan

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Express	3	75.8	--	--	58.2	79.8	71.3	133.7
Hamer	2	--	--	--	53.5	73.4	63.4	128.2
Pioneer 2375	4	--	71.8	74.0	66.9	76.7	72.4	121.2
Norlander	2	--	--	--	44.6	75.3	60.0	121.1
Sonja	4	--	81.8	85.9	39.2	76.9	71.0	118.9
Keene	1	--	--	--	--	75.8	75.8	116.8
Pioneer 2398	1	--	--	--	--	75.0	75.0	115.6
L ars	2	--	--	--	45.2	68.9	57.0	115.3
Westbred 936	3	63.2	--	--	45.6	70.8	59.9	112.3
Trenton	2	--	--	--	37.4	70.9	54.2	109.4
McNeal	5	61.5	64.3	89.9	40.3	71.1	65.4	109.2
Westbred 926	3	58.5	--	--	40.2	71.8	56.8	106.6
Hi-Line	5	61.1	61.4	81.3	36.6	68.4	61.8	103.1
Grandin	4	--	68.9	73.3	40.0	64.0	61.6	103.1
Newana	5	60.9	59.0	80.7	34.1	64.9	59.9	100.0
Amidon	5	60.9	61.8	74.4	33.0	68.4	59.7	99.6
Stoa	3	--	--	78.2	35.5	64.1	59.3	98.9
Kulm	3	--	--	66.3	38.6	69.2	58.0	96.9
Lew	3	--	--	75.5	39.8	57.0	57.4	95.9
Ernest	3	--	--	61.1	40.2	65.5	55.6	92.8

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 Newana.

Table 28. Relative test weights of spring wheat varieties as compared to Newana when grown under irrigated conditions in Valley County in cooperation with CES.
Cooperator: Kelly Donovan

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Keene	1	--	--	--	--	61.7	61.7	106.0
Kulm	3	--	--	63.7	60.1	62.7	62.2	104.3
Pioneer 2375	4	--	61.7	64.8	60.5	61.0	62.0	104.1
Lew	3	--	--	64.9	61.0	59.3	61.7	103.6
Hamer	2	--	--	--	59.5	59.8	59.6	103.6
Ernest	3	--	--	64.1	58.7		61.7	103.5
Norlander	2	--	--	--	58.2	60.8	59.5	103.3
Amidon	5	61.2	61.0	63.3	58.6	61.0	61.0	102.8
Pioneer 2398	1	--	--	--	--	59.8	59.8	102.7
Trenton	2	--	--	--	57.7	60.5	59.1	102.6
Express	3	58.8	--	--	59.9	59.0	59.2	102.3
Grandin	4	--	61.4	63.8	58.6	58.3	60.4	101.6
Hi-Line	5	60.8	60.6	64.4	57.0	58.5	60.3	101.5
Stoa	3	--	--	64.9	56.8	59.7	60.5	101.5
Sonja	4	--	62.0	63.9	57.7	56.5	60.0	100.8
Newana	5	58.5	59.5	63.6	57.0	58.2	59.4	100.0
McNeal	5	59.3	60.2	63.2	56.8	57.3	59.4	100.0
Lars	2	--	--	--	56.6	56.8	56.7	98.4
Westbred 936	3	60.9	--	--	54.9	57.3	56.1	97.4
Westbred 926	3	57.1	--	--	54.2	57.3	56.2	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 Newana.

Table 29. Relative protein contents of spring wheat varieties as compared to Newana when grown under irrigated conditions in Valley County in cooperation with CES.
Cooperator: Kelly Donovan

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Newana
Kulm	3	--	--	17.7	16.2	15.0	16.3	112.9
Ernest	3	--	--	17.2	15.7	14.6	15.8	109.7
Stoa	3	--	--	15.9	15.8	14.5	15.4	106.7
Westbred 936	3	13.2	--	--	16.1	14.8	14.7	105.0
Grandin	4	--	14.6	15.1	14.8	14.6	14.8	104.6
Sonja	4	--	13.8	15.3	15.2	14.8	14.8	104.6
Lew	3	--	--	14.5	15.8	14.8	15.0	104.2
Trenton	2	--	--	--	15.8	14.5	15.2	104.1
McNeal	5	12.8	14.4	15.2	15.4	14.4	14.4	104.0
Hi-Line	5	13.0	14.8	14.7	15.3	14.4	14.4	104.0
Pioneer 2375	4	--	13.6	15.3	15.2	14.2	14.6	103.2
Amidon	5	12.9	13.9	15.3	15.3	13.8	14.2	102.6
Westbred 926	3	12.9	--	--	15.5	14.4	14.3	101.9
Pioneer 2398	1	--	--	--	--	14.2	14.2	100.7
Newana	5	12.9	13.2	14.2	15.0	14.1	13.9	100.0
Norlander	2	--	--	--	15.3	13.7	14.5	99.7
Lars	2	--	--	--	14.8	14.0	14.4	99.0
Hamer	2	--	--	--	14.7	14.0	14.4	98.6
Keene	1	--	--	--	--	13.8	13.8	97.9
Express	3	12.1	--	--	14.5	14.0	13.5	96.7

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 Newana.

Table 30. Performance of durum grown under dryland conditions at Circle, MT.
Planted: 6 May 1996 Harvested: 29 August 1996
Cooperator: Victor Wagner

Variety	height, inches	grain protein	test weight	yield, bu/acre
Dressler	18	11.5	62.7	15.1
Renville	18	12.7	62.2	14.5
Voss	17	12.3	63.8	14.0
Plenty	20	12.9	62.1	14.0
Munich	17	13.0	61.6	13.1
Medora	20	12.9	62.8	12.7
Kyle	18	12.9	63.4	12.4
Vic	19	12.7	62.5	12.0
Ward	17	12.4	63.2	11.9
Ben	17	13.0	63.2	11.6
Monroe	19	13.1	62.8	11.0
Cortez	13	14.1	62.7	10.6
average	17.8	12.80	62.8	12.7
p value	0.00	0.01	0.00	0.00
CV (S/Mean)	5.4	4.5	0.7	9.9
CV(SE/Mean)	3.1	2.6	0.4	5.7
LSD 0.05	1.6	1.0	0.8	2.1

Table 31. Performance of durum grown under dryland conditions at Poplar, MT.
Planted: 7 May 1996 Harvested: 8 August 1996
Cooperator: Mark Swank

Variety	height, inches	grain protein	test weight	yield, bu/acre
Plenty	29	15.0	61.0	24.4
Renville	27	14.2	61.7	24.3
Kyle	30	14.0	61.0	23.7
Voss	21	13.0	62.3	23.0
Munich	23	15.0	60.7	22.8
Ben	26	14.8	61.7	21.4
Vic	28	16.1	60.5	21.2
Monroe	25	14.7	61.5	21.0
Cortez	19	15.2	61.2	20.5
Dressler	26	16.6	60.4	20.5
Ward	26	14.7	62.0	20.1
Medora	26	14.8	61.8	19.5
average	25.5	14.9	61.3	21.9
p value	0.00	0.00	0.00	0.01
CV (S/Mean)	5.6	5.3	0.8	7.6
CV(SE/Mean)	3.3	3.0	0.5	4.4
LSD 0.05	2.4	1.3	0.9	2.8

Table 32. Relative yields of durum varieties as compared to Renville when grown under dryland conditions in Roosevelt County in cooperation with CES. Cooperator: Mark Swank

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Renville
Kyle	3	--	--	52.8	45.3	23.7	40.6	103.0
Munich	2	--	--	--	43.2	22.8	33.0	102.3
Plenty	3	--	--	54.2	40.6	24.4	39.7	100.8
Renville	5	48.0	53.5	53.8	40.2	24.3	44.0	100.0
Voss	2	--	--	--	38.7	23.0	30.8	95.7
Vic	3	--	--	47.9	39.4	21.2	36.2	91.7
Ward	5	44.6	41.3	53.3	38.0	20.1	39.5	89.8
Medora	5	43.2	45.2	49.4	40.0	19.5	39.5	89.7
Ben	1	--	--	--	--	21.4	21.4	88.1
Monroe	5	36.3	43.7	48.2	37.3	21.0	37.3	84.8
Cortez	1	--	--	--	--	20.5	20.5	84.4
Dressler	1	--	--	--	--	20.5	20.5	84.4

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 Renville.

Table 33. Relative test weights of durum varieties as compared to Renville when grown under dryland conditions in Roosevelt County in cooperation with CES. Cooperator: Mark Swank

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Renville
Voss	2	--	--	--	61.1	62.3	61.7	100.7
Ward	5	63.2	61.3	62.2	62.0	62.0	62.1	100.6
Medora	5	63.6	62.0	61.9	61.4	61.8	62.1	100.5
Munich	2	--	--	--	61.9	60.7	61.3	100.1
Renville	5	63.2	61.8	61.5	60.8	61.7	61.8	100.0
Ben	1	--	--	--	--	61.7	61.7	100.0
Kyle	3	--	--	61.6	61.0	61.0	61.2	99.8
Plenty	2	--	--	61.2	60.8	61.0	61.0	99.5
Monroe	5	63.1	60.2	61.7	60.2	61.5	61.3	99.3
Cortez	1	--	--	--	--	61.2	61.2	99.2
Vic	3	--	--	61.9	59.2	60.5	60.5	98.7
Dressler	1	--	--	--	--	60.4	60.4	97.9

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 Renville.

Table 34. Relative proteins of durum varieties as compared to Renville when grown under dryland conditions in Roosevelt County in cooperation with CES. Cooperator: Mark Swank

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Renville
Dressler	1	--	--	--	--	16.6	16.6	116.9
Vic	3	--	--	12.2	16.7	16.1	15.0	109.2
Cortez	1	--	--	--	--	15.2	15.2	107.0
Medora	5	15.0	12.3	11.9	15.8	14.8	14.0	104.2
Ben	1	--	--	--	--	14.8	14.8	104.2
Monroe	5	14.4	12.2	12.2	15.3	14.7	13.8	102.7
Plenty	3	--	--	11.6	15.7	15.0	14.1	102.7
Ward	5	14.8	12.0	11.9	15.2	14.7	13.7	102.4
Kyle	3	--	--	11.6	16.0	14.0	13.9	101.0
Munich	2	--	--	--	14.9	15.0	15.0	100.3
Renville	5	14.6	11.2	11.4	15.6	14.2	13.4	100.0
Voss	2	--	--	--	14.9	13.0	14.0	93.6

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, Renville.

Table 35. Performance of durum grown under dryland conditions at Reserve, MT.
Planted: 9 May 1996 Harvested: 30 August 1996
Cooperator: Max Aasheim

Variety	height, cm	grain protein	test weight	yield, bu/acre
Renville	52	12.6	63.8	35.5
Vic	59	13.5	63.5	34.4
Munich	47	13.3	64.0	34.0
Dressler	52	13.4	64.5	33.4
Kyle	58	13.5	63.5	32.8
Plenty	54	14.4	64.0	32.8
Ben	53	13.4	64.5	32.7
Voss	40	12.9	64.3	32.5
Ward	54	13.0	64.2	29.3
Medora	48	13.6	64.0	28.0
Monroe	49	13.0	63.7	27.5
Cortez	39	15.2	62.6	21.6
average	50.6	13.5	63.9	31.2
p value	0.00	0.00	0.00	0.00
CV (S/Mean)	6.9	3.5	0.5	9.8
CV(SE/Mean)	4.0	2.0	0.3	5.7
LSD 0.05	6.0	0.8	0.6	5.2

Table 36. Relative yields of durum varieties as compared to Renville when grown under dryland conditions in Sheridan County in cooperation with CES. Cooperator: Max Aasheim

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Renville
Plenty	4	48.0	--	65.3	26.9	32.8	43.2	101.0
Kyle	3	--	--	63.1	33.2	32.8	43.0	101.0
Renville	5	43.5	21.7	62.8	29.5	35.5	38.6	100.0
Vic	3	--	--	61.8	31.2	34.4	42.5	99.7
Munich	2	--	--	--	27.5	34.0	30.8	94.6
Voss	2	--	--	--	28.7	32.5	30.6	94.2
Dressler	1	--	--	--	--	33.4	33.4	94.1
Ben	1	--	--	--	--	32.7	32.7	92.1
Ward	5	39.9	21.2	60.5	26.6	29.3	35.5	92.0
Monroe	5	43.8	17.9	57.4	28.9	27.5	35.1	90.9
Medora	5	40.2	19.7	57.9	29.3	28.0	35.0	90.7
Cortez	1	--	--	--	--	21.6	21.6	60.8

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 Renville.

Table 37. Relative test weights of durum varieties as compared to Renville when grown under dryland conditions in Sheridan County in cooperation with CES. Cooperator: Max Aasheim

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Renville
Voss	2	--	--	--	62.5	64.3	63.4	101.4
Ben	1	--	--	--	--	64.5	64.5	101.1
Dressler	1	--	--	--	--	64.5	64.5	101.1
Vic	3	--	--	61.0	61.0	63.5	61.8	100.9
Kyle	3	--	--	58.8	63.3	63.5	61.9	100.9
Medora	5	61.2	62.3	60.1	62.2	64.0	62.0	100.8
Munich	2	--	--	--	62.0	64.0	63.0	100.8
Plenty	4	60.9	--	59.5	62.1	64.0	61.6	100.4
Ward	5	60.9	61.6	60.2	61.3	64.2	61.6	100.3
Renville	5	61.5	61.8	58.9	61.2	63.8	61.4	100.0
Monroe	5	60.1	60.3	60.4	59.8	63.7	60.9	99.1
Cortez	1	--	--	--	--	62.6	62.6	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 Renville.

Table 38. Relative protein contents of durum varieties as compared to Renville when grown under dryland conditions in Sheridan County in cooperation with CES. Cooperator: Max Aasheim

Cultivar	# of years	1992	1993	1994	1995	1996	Ave	as % of Renville
Cortez	1	--	--	--	--	15.2	15.20	120.6
Voss	2	--	--	--	10.0	12.9	11.45	107.0
Ben	1	--	--	--	--	13.4	13.40	106.3
Dressler	1	--	--	--	--	13.4	13.40	106.3
Plenty	4	13.6	--	14.8	9.3	14.4	13.03	106.1
Munich	2	--	--	--	9.4	13.3	11.35	106.1
Medora	5	13.4	14.2	15.6	9.7	13.6	13.30	105.6
Vic	3	--	--	15.1	9.2	13.5	12.60	103.3
Monroe	5	12.9	15.0	14.8	9.2	13.0	12.98	103.0
Ward	5	12.4	14.6	15.5	9.2	13.0	12.94	102.7
Kyle	2	--	--	14.1	9.2	13.5	12.27	100.5
Renville	5	12.5	13.9	15.2	8.8	12.6	12.60	100.0

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

Table 39. Performance of durum grown under irrigated conditions at Scobey, MT.
Planted: 8 May 1996
Harvested: 3 September 1996
Cooperator: Kenny Benson

Variety	height, inches	lodging index	grain protein	test weight	yield, bu/acre
Kyle	39	4.0	14.5	61.8	64.0
Dressler	33	0.3	13.7	61.5	63.8
Voss	26	0.0	13.0	62.2	63.7
Plenty	36	1.0	13.9	61.5	63.0
Renville	34	1.3	13.0	62.3	62.0
Vic	36	1.7	13.8	61.7	60.7
Ben	33	1.7	13.3	63.3	58.4
Munich	30	0.0	13.2	61.3	57.6
Cortez	24	0.3	13.6	60.0	53.6
Medora	34	1.0	13.6	62.7	53.6
Ward	37	1.7	13.0	63.7	53.3
Monroe	32	1.0	13.0	61.7	46.2
average	32.9	1.2	13.47	62.0	58.3
p value	0.00	0.00	0.00	0.00	0.00
CV (S/Mean)	4.0	60	1.0	1.0	7.2
CV(SE/Mean)	2.3	35	0.6	0.6	4.2
LSD 0.05	2.2	1.2	1.0	1.0	7.1

Table 40. Performance of durum grown under irrigated conditions at Dagmar, MT.
Planted: 9 May 1996 Harvested: 30 August 1996
Cooperator: Steve Brekke

Variety	height, cm	grain protein	test weight	yield, bu/acre
Vic	75	9.2	64.0	50.1
Kyle	75	10.5	61.7	48.9
Plenty	80	9.4	62.3	47.8
Dressler	68	11.5	59.7	45.7
Munich	63	10.5	60.3	39.9
Ben	64	10.9	61.7	38.3
Renville	64	11.3	59.8	35.8
Voss	55	11.3	60.2	33.2
Ward	62	12.0	58.7	32.7
Medora	71	10.6	60.8	31.1
Monroe	62	11.1	58.9	29.2
Cortez	42	14.0	54.1	26.2
average	65.0	11.02	60.2	38.3
p value	0.00	0.00	0.00	0.00
CV (S/Mean)	9.8	5.7	2.5	14.1
CV(SE/Mean)	5.6	3.3	1.4	8.1
LSD 0.05	10.8	1.1	2.5	9.1

Table 41. Relative yields of durum varieties as compared to Renville when grown under irrigated conditions in Sheridan County in cooperation with CES. Cooperator: Steve Brekke

Cultivar	# of years	1989	1990	1991	1993	1996	Ave	as % of Renville
Kyle	1	--	--	--	--	48.9	48.9	136.6
Plenty	1	--	--	--	--	47.8	47.8	133.5
Dressler	1	--	-	--	--	45.7	45.7	127.7
Munich	1	--	--	--	--	39.9	39.9	111.5
Ben	1	--	--	--	--	38.3	38.3	107.0
Medora	5	66.1	55.1	41.3	73.2	31.1	53.4	106.6
Vic	3	--	58.2	26.8	--	50.1	45.0	104.2
Ward	5	67.6	57.7	33.0	64.3	32.7	51.1	102.0
Renville	5	53.5	60.2	33.6	67.1	35.8	50.0	100.0
Monroe	5	42.4	41.2	35.1	86.3	29.2	46.8	93.6
Voss	1	--	--	--	--	33.2	33.2	92.7
Cortez	1	--	--	--	--	26.2	26.2	73.2

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 Renville.

Table 42. Relative test weights of durum varieties as compared to Renville when grown under irrigated conditions in Sheridan County in cooperation with CES. Cooperator: Steve Brekke

Cultivar	# of years	1989	1990	1991	1993	1996	Ave	as % of Renville
Plenty	1	--	--	--	--	62.3	62.3	104.2
Kyle	1	--	--	--	--	61.7	61.7	103.2
Ben	1	--	--	--	--	61.7	61.7	103.2
Vic	3	--	58.0	58.7	--	64.0	60.2	102.8
Munich	1	--	--	--	--	60.3	60.3	100.8
Voss	1	--	--	--	--	60.2	60.2	100.7
Medora	5	62.1	57.5	58.0	59.6	60.8	59.6	100.2
Ward	5	61.5	57.5	59.2	61.3	58.7	59.6	100.2
Renville	5	62.0	58.0	58.0	59.7	59.8	59.5	100.0
Dressler	1	--	--	--	--	59.7	59.7	99.8
Monroe	5	61.0	57.0	57.8	59.7	58.9	58.9	99.0
Cortez	1	--	--	--	--	54.1	54.1	90.5

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 Renville.

Table 43. Relative protein contents of durum varieties compared to Renville when grown under irrigated conditions in Sheridan County in cooperation with CES. Cooperator: Steve Brekke

Cultivar	# of years	1989	1990	1991	1993	1996	Ave	as % of Renville
Cortez	1	--	--	--	--	14.0	14.00	123.9
Medora	5	11.4	16.5	15.0	14.4	10.6	13.58	103.5
Dressler	1	--	--	--	--	11.5	11.50	101.8
Monroe	5	12.7	15.5	13.0	14.0	11.1	13.26	101.1
Renville	5	11.5	15.0	13.6	14.2	11.3	13.12	100.0
Voss	1	--	--	--	--	11.3	11.30	100.0
Ward	5	11.5	15.3	11.9	14.6	12.0	13.06	99.5
Ben	1	--	--	--	--	10.9	10.90	96.4
Kyle	1	--	--	--	--	10.5	10.50	92.9
Munich	1	--	--	--	--	10.5	10.50	92.9
Vic	3	--	15.7	12.1	--	9.2	12.33	92.7
Plenty	1	--	--	--	--	9.4	9.40	83.2

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